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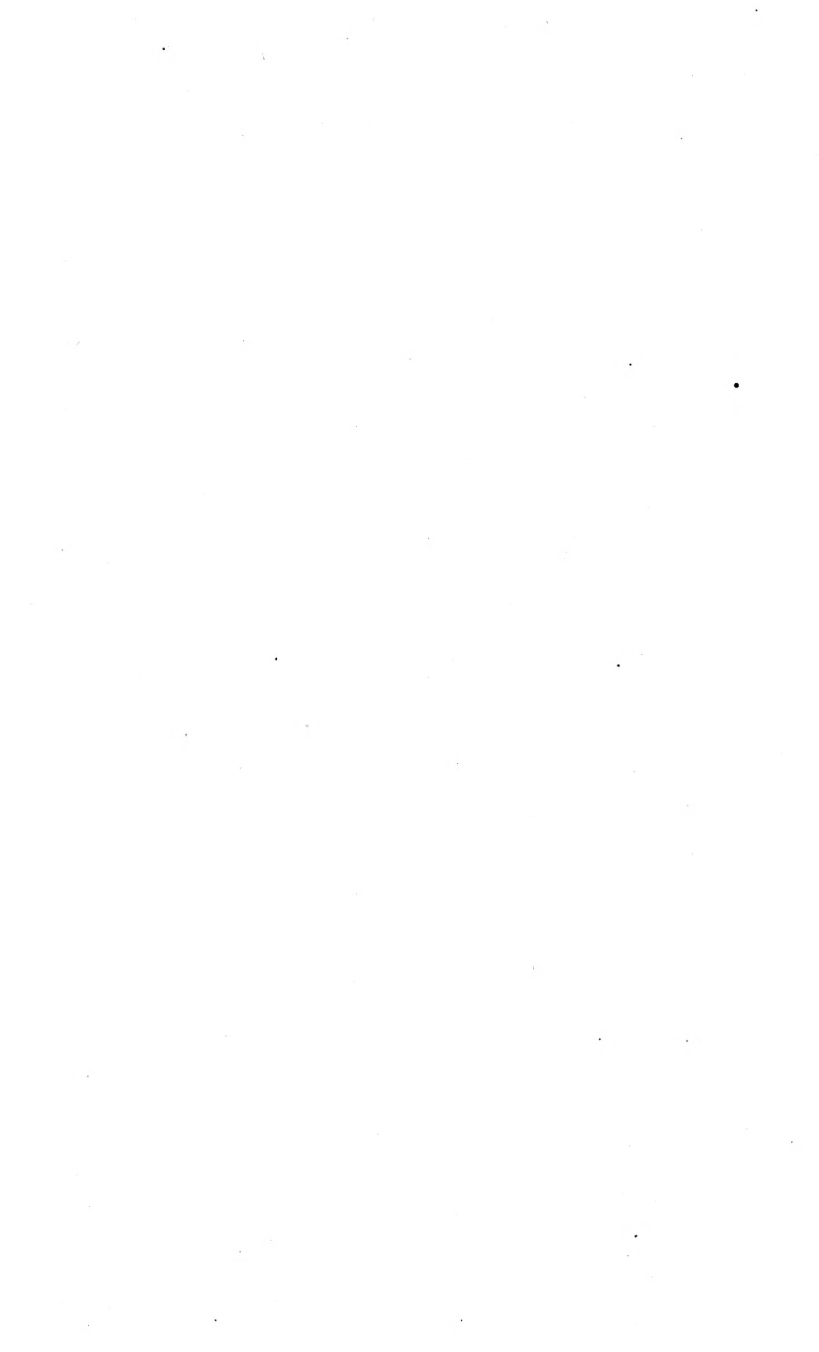
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**FEEDING AND MANAGEMENT
OF DAIRY CATTLE
FOR OFFICIAL PRODUCTION**





IMPORTED GOLDEN FERN'S NOBLE

FEEDING AND MANAGEMENT OF DAIRY CATTLE FOR OFFICIAL PRODUCTION

BY
MORRIS H. ROBERTS, JR.

WITH AN INTRODUCTION
BY
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INTRODUCTION

FIRST-HAND information, the result of practical experience gathered on one of the most successful and best equipped dairy farms of this country — this is what the author here lays before the public.

Mr. Morris H. Roberts, Jr., is not a writer of books. He is a practical farmer, trained at the New Jersey State College of Agriculture, since the establishment, several years ago, of the present herd, he has been manager of the large estate of Brookwood Farms (Barryville, N. Y.), owned by Mr. William Ross Proctor. At the request of the publishers and in response to numerous inquiries from dairymen throughout the country he has taken the pen in hand in order to place at the disposal of the general public his valuable knowledge and experience in the breeding and rearing of the highest type of dairy cattle, and in the efficient management of a modern and a model dairy farm.

The Brookwood herd numbers over one hundred of the finest Jersey cattle, headed by the famous bull "Imported Golden Fern's Noble." The health of this herd — a matter of the highest importance alike to the producer and to the consumer — is attested by the excellent record both of calves and of

cows. The number of deaths among normally born calves has averaged less than one a year. Among the cows colds have been unknown and certain digestive troubles almost completely eliminated since the present method of giving them outdoor exercise throughout the year was adopted. There has never been a positive reaction for tuberculosis in the herd, which is on the Government Accredited Herd list.

Such successes are not gained by haphazard. They are the result of careful and systematic attention to detail in selection of stock, in breeding, feeding and management.

In order that the reader may judge for himself of the value of the methods developed and practised at Brookwood Farms on Mr. Proctor's estate, which will be set forth in the pages to follow, a brief survey of some of the most significant records obtained will now be given.

The true measure of the standard of attainment of a herd is not to be seen in occasional extraordinary records of a few individuals, but rather in the general average maintained by the herd as a whole. At Brookwood, taking an average of the test herd the year round, each cow produces her own weight in milk every month.

The average production per head for the 26 cows that completed official tests during the year ending June 1, 1919, was 11,259 pounds of milk containing 619 pounds of butter fat or 728 pounds of 85 per cent butter, as follows:

Cow	Age		Milk	Fat	85% butter
	yrs.	mos.			
Beechland's Champion Lily 291462.....	11	9	14,355.6	829.26	975.13
* Oxford's Wexford Spot 289464.....	6	8	14,140.0	786.10	924.84
* Imported Whitie 382297.....	7	5	12,519.0	745.14	876.46
* Jolly Iris 378462.....	7	5	11,728.5	740.98	871.73
* Golden Fern's Benedictine 355742.....	5	0	13,050.0	731.27	860.33
* Sophie's Emily 352291.....	2	3	13,792.1	723.56	851.25
Dorothy's Noble Fern 353250.....	6	6	11,066.4	703.61	827.78
* Jessie's Plymouth 239213.....	7	7	13,904.2	700.03	823.47
Sweet Dairylike 378464.....	7	2	11,544.7	692.60	814.81
Plymouth's Financial Lassie 415895.....	7	9	13,390.8	671.75	790.07
Campanile's Golden Maid 349938.....	8	2	11,436.8	653.26	769.53
Premier's Cowslip 371523.....	5	5	11,199.3	647.09	761.27
Golden Champion Brown Maid 378906..	10	1	11,611.1	645.00	758.83
Dorothy's Oxford Pearl 371524.....	5	4	11,021.1	637.88	750.44
Figgis' Bess 306802.....	5	3	13,099.2	628.25	739.11
Staraldan 382299.....	7	6	11,967.9	614.09	722.47
Oswald's Pet 371520.....	9	9	11,607.6	606.02	712.98
Warder's Fern Blossom 271118.....	5	9	10,723.5	598.34	703.81
Golden Fern's Claire 349944.....	5	10	9,516.9	591.16	694.47
Jennie You'll Do 353255.....	5	5	11,738.9	576.14	677.81
Wexford's Gipsy Maid 370521.....	7	1	11,878.8	554.43	652.26
Agatha's Oxford Rosy 382636.....	5	2	10,166.9	526.39	619.25
Zanzibar's Queen 409965.....	3	3	8,927.0	463.14	534.87
Agatha's Maiden Fern 271121.....	5	7	8,256.6	440.95	518.87
Golden Fern's Carita 370664.....	2	2	5,075.3	308.55	353.00
Golden Fern's Streamer 356845.....	1	11	5,035.9	295.03	347.05

If every one of the 23 million cows in the United States produced at this rate there would be available for every man, woman and child, over three quarts of milk per day. The amount actually obtained in 1909 was less than one twelfth of this. It is not merely that the average cow of our national herd fails to yield the profit attainable under the right conditions. One third of the dairy cows of the United States are actually kept at a loss amounting in the aggregate to 50 million dollars annually, according to an estimate made by Professor Fraser of the University of Illinois. The cost of these "boarders" is, of course, ultimately defrayed in part

out of the pockets of the consumers, in part the loss is borne by the producer. That these unproductive cows remain undiscovered and are thus allowed to continue to burden the herd, is of course a severe indictment of the methods or lack of methods of cost-accounting in the dairy industry, and shows more forcibly, perhaps, than any other circumstance, the need of radical reform.

Care and judgment in the selection of stock and breeding; proper methods of feeding, calf raising and general management; these factors all contribute and are essential to success. This is very clearly shown by the Brookwood records for the last two years. In 1917, with 95 per cent of the cows newly imported, an average of 38 per cent of the test animals produced 50 pounds or more of butter fat per month. In 1918, after opportunity had been given for the imported cows to become acclimated, the average number on the 50-pound list had risen to 54 per cent, with a maximum of 73 per cent for the month of May.

Several cows that specially distinguished themselves had shown no indication of exceptional merit before coming to Brookwood. This is true, for example, of Beechlands Champion Lily, who in 365 days, beginning the test at 11 years, 6 months of age, produced 14,355.6 pounds of milk containing 829 pounds of butter fat, equivalent to 975 pounds of 85 per cent butter. This record makes her the highest testing Island cow beginning test at this age. The Gold Medal Cow, Oxford's Wexford Spot, who has to her credit a year's production of 14,140 pounds

of milk, 786 pounds of butter fat, or 924 pounds of 85 per cent butter, also came to Brookwood without any established previous record. Her month's record now is 1,703 pounds of milk. In two years she dropped three calves, produced 24,206 pounds of milk and 1,311 pounds of butter-fat, the equivalent of 1,542 pounds of butter, in 665 milking days. The total absence of anything in the nature of forcing is firmly established by the fact that in the eleventh month of her test she produced more than in the first month.

Golden Fern's Benedictine in the month of March 1918 returned a profit of \$50.58 above cost of feed. The average profit for the entire test herd that month was \$21.42 per cow.

While the evidence presented points conclusively to the excellence of the general methods developed and practised at Brookwood, the farm is, of course, fortunate in the possession of the splendid herd sire Golden Fern's Noble, whose virtues are so well known as hardly to require mention. He has 50 tested daughters and 15 proven sons. Of the cows in the 50-pound list in October, 1918, over 15 per cent were descendants of his sire, Noble of Oaklands, and of these nearly 21 per cent were descended from Golden Fern's Noble himself. Of the 156 cows on the list that month eighteen or 11.5 per cent belonged to the Brookwood herd.

In the pages which follow the author has placed at the disposal of the reader his knowledge of the dairy industry, but it is not knowledge alone which is needed for success. As Mr. Roberts has pointed out

elsewhere, the requirements for a successful dairy farmer are, first and foremost, that he should be a lover of live stock and an honest business man. He must realize that dairying is a big business proposition, and that the secret of success in dairying is a well-developed systematic plan of organization, well carried out.

He must be a willing worker; there are times when it is necessary to work day and night.

He must have the ability to plan and knowledge and experience of the many phases of farming. For he will need to take care not only of his live stock, but also of crops; he must know when and how to economise by employing home-grown feeds; he must keep himself well posted on market conditions and be able to superintend the care and construction of buildings. He needs judgment in preparing and placing advertising matter.

Last, but not least, he must have in his mind a definite aim to build up a vigorous herd of good type, high producers, and economical producers.

To lay the foundation for success in this aim there must be a prearranged plan or system, based on such a scheme as the following:

AIM	FACTORS	DETAILS
The development of a vigorous, economical and high-producing type herd.	1. Proper selection and breeding.	{ A breeding system worked out with due regard to production, prepotency and type, and based upon the record of the ancestors and the present production of the individual.
	2. Proper development of the calf.	{ The best methods of feeding, to keep the calf in vigorous condition, always growing, with no setbacks. Prevention of avoidable sickness and disorders, etc.
	3. Proper feeding and management of the herd.	{ The selection of the best possible rations and methods of feeding. Systematic determination of the proper amounts of feed for the most economical production; management of men; attention to buildings, market conditions, costs, etc.

It is with such a scheme as this in mind that the study and the practise of dairy farming should be approached.

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**FEEDING AND MANAGEMENT
OF DAIRY CATTLE**

FEEDING AND MANAGEMENT OF DAIRY CATTLE

CHAPTER I

ESTABLISHING AND DEVELOPING A PURE-BRED HERD

IN THE business of dairy farming we may distinguish two types of establishment. There is first the farmer, whose main object is the profit derived from the sale of dairy products alone. Secondly we have the dairy farmers, or breeders, who are establishing or who have established a herd of registered cows, and whose main object is the improvement of the breed and the distribution of the surplus progeny, and with whom the sale of dairy products is secondary. The farmer who is in the second class is naturally doing more to increase production because he is improving his herd by selection and breeding and official testing. A farmer of the first of these two classes will as a rule try to select a bull whose dam was a good milker, and he uses this bull for the purpose of having his cows freshen at a time of the year when his trade demands the most milk. The male calves are usually sold for veal, and enough of the heifer calves raised to replenish the worn-out milking cows. If there happens to be a shortage of milk to feed the calves and the pastures are poor, he will dispose of all of his calves, and when

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necessary buy fresh cows. No doubt he is making a living or he would not continue. He knows, if he reads agricultural literature, the value of a pure-bred sire, and that by using one on his herd he would greatly increase the milk yield. The Iowa State College found in crossing scrub cows with pure-bred sires that an increase was obtained of 71 per cent in milk and 42 per cent in fat.

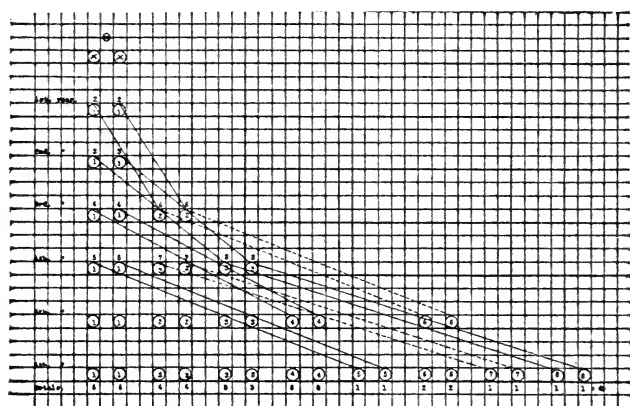


Chart illustrating how the progeny of two foundation cows can build up a herd of forty in six years time.

Three methods of establishing a herd are: (1.) The purchase outright of a herd consisting of mature animals; (2.) The purchase and development of a calf herd; (3.) The purchase of a few foundation cows and one bull and building up of a herd consisting of descendants of this foundation stock.

Usually a farmer's excuse for not attempting to develop a pure bred herd is that it costs too much to invest in that kind of stock, but if he could in-

crease his production 71 per cent by the use of a pure-bred bull, as the Iowa State College have done, and further increase his profits by keeping accurate records on each cow of the cost of feed consumed and milk produced, and determine whether the cow will produce enough milk to pay for an additional pound of grain consumed, he would undoubtedly succeed, providing that he had the necessary qualifications for a successful manager.

This chart illustrates how it is possible for two foundation cows and one bull to increase to a herd of 40 animals within a period of six years. This is the plan that should be followed in the establishing of a herd under the third method noted above. It is the most economical and satisfactory method in that it requires the least outlay, and if the best foundation cows are selected a good herd can be developed within six years, paying for its development as they go. The likelihood of importing disease as compared with that incurred when buying a number of cows is very small.

In addition to using this method of establishing a herd it can also be used for improving a herd. If a farmer has a grade herd, his aim should be to have eventually all pure-bred cows. He should not attempt to make the change too suddenly, but to gradually work in to pure-breds by replacing two of his grade cows with two registered cows and one registered bull, if he does not already possess one, and then follow the schedule as outlined on the chart. While it is possible for the original two foundation cows to multiply to forty, we should be entirely

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satisfied after allowing for losses and breeding troubles, to figure on from 25 to 30. It is to be assumed that the bull calves are sold, and registered heifers purchased from the proceeds.

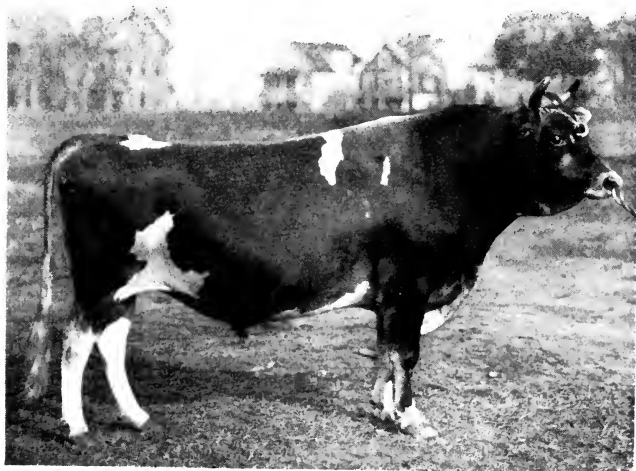
Once the farmer has thus established a herd of high quality, he renders himself practically independent of external resources so far as breed is concerned. He may, of course with his increased profits, desire to purchase still better stock at higher prices; although by continued attention to his own stock there is no reason why he should not improve it from within to the highest standard which his resources enable him to maintain. In the meantime his income will have been augmented not only by the increased productivity of his milch cows, but also by the sale of pure-bred calves at proportional prices.

Picture to yourself the result if every farmer were to do his part in raising the standard of milk production to what it should be. He could at least relieve us of the wholly unnecessary burden of that unproductive third of the country's herd. That would be his part in a national service, a part for which he would be very liberally paid by his increased profits.

The two foundation cows marked X are bred so that they will have a calf each year. In six years time they will have six calves each, marked 1. When the first calves are two years old they will each have a calf, marked 2. It will not be advisable to breed the original bull to his own daughters, but to use his own son, out of another cow. If any of the calves marked from 2 to 8 on top of the circles are



OSWALD'S PET AND FOUR OF HER SONS
AND DAUGHTERS



NOBLE SULTAN'S GOLDEN FERN

bulls, they will be sold and the money used to purchase heifers, to replace them for breeding.

We have seen that the progeny of one cow may, not allowing for losses, reach in six years a total of twenty head; calculation shows that in twice that time, assuming one calf each year for every cow two years old or over, and not allowing for deaths, the number would swell to one hundred and eighty-seven.

CHAPTER II

CALVES, FROM BIRTH UNTIL TWO YEARS OLD

THE ACCOMPANYING calf schedule (*See page 24*) should be hung in a convenient place in the calf barn, so that it can be studied and referred to by the man who is caring for the calves. It has been prepared as a guide and can be followed very closely, but a large share of the success in raising calves is due to the feeder, who by experience and good judgment knows when to feed more or less than is called for on the chart.

Just before the calf is born the cow should have a dose of epsom salts, about one pound in two quarts of water; this helps to cool the blood and acts as a laxative. After the first signs of calving, if you are sure that all of the conditions are normal, it is best to leave the cow entirely alone in the maternity stall until immediately after calving, at which time the foetal membrane that covers the nose is removed so that the calf will not suffocate. If it is apparently strong and healthy it will require no further immediate attention. If the presentation is abnormal, the condition should be attended to at once by an experienced man. After the cow has licked her calf dry, she should be tied in one corner of the stall,



CALF ONE MONTH OLD



BULL CALF FOUR MONTHS OLD

leaving the tie rope long enough for her to lie down. She should be left there until she has cleaned; the placenta is, of course, removed from the stall.

The calf should have the first or colostrum milk, which it will usually nurse naturally and without assistance. If the udder is exceptionally hard, or the calf unusually weak, it may be necessary to assist the calf to nurse, which can be done by milking the cow and feeding it to the calf with a bottle and nipple, or by holding the calf up to the udder and allowing it to nurse itself. Under no condition is the calf permitted to remain with the dam longer than 24 hours. There are no material advantages to be gained by allowing the calf to remain longer than this. On the contrary, the calf is very apt to suffer if it stays longer than this with the mother, as it is liable to drink too often or to take too much milk at one time. In the case of channel island breeds, the milk may be too rich and cause scours. Moreover if the calf is left with the dam for several days or weeks, there will be a setback or loss of flesh when it is weaned, which is contrary to our aim to keep the calf growing without any setback. When weaned within twenty-four hours, the calves learn to drink from the pail at the first or second feeding, and the change does not affect them in any way. Another reason for immediate weaning is that the whole milk available for sale is correspondingly increased, an item worth considering. Then again cows that are placed on official test are usually started the fourth day after calving, and if there is not a long enough interval between weaning

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time and the start of the test, a cow will hold her milk back for the calf.

If the dam is in good condition the calf is fed mother's milk for the first ten days. It is allowed to nurse twenty-four hours only, and for the following nine days the dam is milked by hand and the milk modified as follows: two pounds of the dam's milk and one half pound of skim milk, fed three times a day. It is very important that the temperature be about 100 degrees. If the milk has stood and cooled, it will be necessary to heat it again, either over a stove or by allowing live steam to run through it.

In some instances we may have to wean the calf immediately or very soon after birth. It sometimes happens that heifer with her first calf refuses to let it nurse and she may even severely injure it by kicking; or the dam may have an attack of milk fever and be unable to nurse. Under such conditions the calf is immediately removed and placed in a separate stall. If it has not had any of the colostrum milk, give it a dose of castor oil (1 to 2 ounces in a little milk, and repeat again later if necessary). This will have the same effect as the colostrum milk in cleaning out the calf and leaving its digestive system in a better condition to digest the herd milk which we have been forced to use. The results from this substitution will, however, be just as satisfactory as though the dam's milk had been used, provided the bowels are kept in a normal condition. In this emergency start feeding according to the schedule for the first ten days on the chart.

Calves from Birth until Two Years 11

As a preventive of white scours or other infectious diseases that may enter the system through the navel of the calf, it should be painted with iodine as soon as possible after birth, and this operation should be repeated before weaning.

While the calf is still with its dam, it should be identified, so that there will be no possibility of its

Brookwood Farms Herd

BIRTH RECORD

Herd No. B173. June 26, 1918.
Golden Ferns Vale Lily.
dropped a Female calf this day.
Color Tongue white Switch white
Marks spot in forehead, hind ankles
and shank's white. belly white
Remarks Normal birth, cleaned O.K. both O.K.

This slip to be sent to Farm Office immediately after calf is dropped.

getting confused with other calves of the same size and description. A very simple and successful method is to have a collar or light chain securely strapped around the neck and locked with a small padlock, which is stamped with the identification number of the calf. This lock can be used permanently. When the horns are large enough to support a chain, the collar is removed and a chain is locked around the horns. After the calf is three

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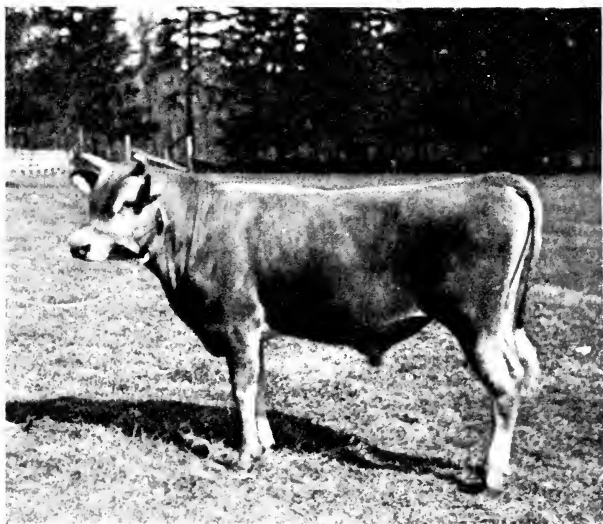
or four days old the same number that has been given as a lock or herd identification number should be tattooed in the ear as a fixed identification mark.

The birth record card is then filled out for future reference in applying for birth certificate, identification, etc.

The calf should now be placed in a separate box stall with solid partitions, so that it cannot come in contact with other calves, and it should remain so isolated for at least the first six weeks. This is to prevent the spreading of any infectious disease that might develop in one of the calves.

After the tenth day replace the dam's milk with the regular herd milk and gradually increase the amount until at the end of the fifteenth day the mixture consists of $3\frac{1}{2}$ pounds of whole milk and $\frac{1}{2}$ pound of skim milk. At this time we can start feeding twice a day. The amount can be continued unchanged until skim milk is substituted, at the age of from four to six weeks, according to the progress and condition of the calf. The change from whole to skim milk is to be made gradually, over a period of at least one week, lessening the amount of whole milk at each meal and adding skim milk. During this time the calf will begin to eat hay and some grain.

The skim milk is increased according to the chart until the calf is six months old, at which time it receives 9 pounds to a feed, or 18 pounds daily. The following standard grain ration is used; Parts by weight, of



BULL CALF 12 MONTHS OLD

Corn Meal.....	3
Ground Oats.....	3
Wheat Bran.....	1
Oil Meal.....	1

All grain is fed in small wooden boxes measuring 12 by 12 by 6 inches, which are placed on shelves or racks in the box stalls so that they will be off the floor and easy to remove for cleaning. This cleaning and sterilizing should be done daily. A small amount of the grain ration should be placed in the boxes after each milk feeding. Never give them more than they will clean up between the milk feedings. For instance, if we give three-quarters of a pound of grain for the morning feed, and at noon notice that there is some grain left in the box, we would cut the next feeding down to one half pound. As a rule the young calf will not overeat grain, but it should be watched closely and fed accordingly. When we first teach the calf to eat grain it will eat about $\frac{1}{8}$ of a pound a day; it will gradually take more until at the end of six months it receives not over two and one half or three pounds daily.

One of the most important things to watch in the young calf is the condition of the bowels, and to treat it promptly in the first stages of trouble. At the first sign of scouring, cut down on the feed supply, in particular cut the amount of milk in half. If the attack is sudden and violent take all of the milk away for at least two feeds and give a dose of castor oil, one to three ounces in a pint of milk (according to size of calf); and as the calf shows signs of recovery increase the feed very slowly.

14 Feeding and Management of Dairy Cattle

Constipation is sometimes as serious as scours and should be treated just as promptly by giving castor oil; in some cases an enema of soapy water, with a little salt added, may be necessary.

An ailment that is very often fatal with calves, is a form of indigestion due to curdled milk or casein in the calf's stomach. The lump of undigested milk finally becomes so hard and tough that it cannot pass into the bowels. In advanced stages this disease seems to affect the brain, and the calf dies as though in a fit. A preventive of this trouble is to give a pinch of baking soda in each feeding of milk. The first symptoms may be hard to distinguish from those of other forms of indigestion; but usually the action on the brain sets in very soon, and the calf appears dizzy, throwing its head back and to one side and finally it falls over as though in a fit. The first treatment upon noticeable signs of dizziness is to give the calf one teaspoonful of bromides in a teaspoonful of water (equal parts of the bromides of Ammonium, Strontium, Sodium, Potassium). The dose should be repeated two or three times if necessary. If the calf is unconscious get a veterinarian as soon as possible and have him inject hypodermically $\frac{1}{20}$ grain of Lobeline Sulphate, and repeat this treatment in one hour if necessary. After recovery do not give any feed for at least 24 hours, and in no case should feeding be commenced until you are satisfied as to the state of the bowels. For three or four weeks feed equal parts of whole milk and water (as it was the casein in the milk that had formed the curds). It is also well to feed one part



CALF BARN



HORN TRAINERS

of lime water, to seven or eight parts of the whole milk and water, and for the first few days give also one teaspoonful of essence of pepsin in the milk at each feeding.

In addition to the above, the following is a list of common ailments with their remedies. The latter should be kept on hand in a medicine closet hung up in a convenient place in the calf barns, to be used for mild cases, and also for emergency cases when the veterinarian cannot be secured at once.

Bloat. $\frac{1}{4}$ teaspoonful formaldehyde in one cup of milk. Follow shortly with $\frac{1}{2}$ teaspoonful of baking soda in warm water.

Cold or Pneumonia. 4 tablespoons whiskey, 1 tablespoon sweet spirits of nitre.

Cold and Fever Above 102.5. One five-grain Aspirin tablet twice a day.

High Temperature. 1 teaspoonful of epsom salts in four ounces of warm water, 3 times a day.

Eczema, Loss of hair, Scabs. 1 tablespoonful of sulphur to four of lard; rub externally.

Fits, Convulsions. See description above for treatment of curd in stomach.

Scours and Bloody Discharge. $\frac{1}{2}$ teaspoonful of Salol, $\frac{1}{4}$ teaspoonful of Subnitrate of Bismuth in milk.

Sour Stomach. 2 teaspoons of milk of magnesia in two pounds of milk, or 1 part of lime water to seven parts of milk.

Sore Eyes. Wash with Boric Acid solution (1 ounce to 1 quart of boiling water; apply when cold).

Toxic condition of the Bowels. Saline injection (2 teaspoons of salt in 2 quarts of warm water), also give $\frac{1}{2}$ teaspoon Creolin Parson in 1 cup of milk.

Vomiting. 2 teaspoons of essence of pepsin in milk 3 times a day.

If the calf does not clean up with relish the scheduled amount of milk, reduce the amount to one half at the next feeding, and gradually increase the amount as the appetite returns.

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The chief difficulty that feeders are likely to have with calves is indigestion, and in raising calves, as in other matters, an ounce of prevention is worth a pound of cure, and especially in the matter of feeding and attention to sanitary conditions is this the rule. The preventive measures in feeding are, first: do not over-feed; second: do not feed too rich milk. Most calf men who have had good results in raising calves will attribute a large share of their success to their attention to these two factors. Aim to keep the young calf growing and in a vigorous, thrifty, but lean condition. During the first six months our object is to build bone and muscle for a good frame, and to develop the barrel for large capacity give plenty of good hay. We can add 100 pounds to the body weight after we get the foundation built. It is almost impossible to tell whether a calf is being over-fed or under-fed unless the quantity of feed is either weighed or measured. If not controlled, a calf will drink two or three times the quantity that is good for it, with disastrous results eventually.

It is very necessary that all the stalls, mangers, feed and water pails, stanchions, etc., be cleaned and scalded daily; this is also a preventive measure on which it is well worth while to spend a little extra time. The health of the calf will also be better if it is given a bath every day, not with soap and water, but with the curry-comb and brush. The bedding and stalls should always be dry and clean.

Do not give alfalfa or clover hay until the calf is six months old. Feed a good mixed timothy and field grasses if possible, and all that the calf wants.



WINTER PASTURE SCENE



SUMMER YARDING SYSTEM

A legume hay is likely to encourage scours, and with skim milk the calf gets sufficient mineral matter for the first six months.

Fresh air and sunlight are two essentials. Where possible the King system of ventilation should be used. The next best thing is to have the windows hinged at the bottom, so that when they are open galvanized cheeks will cover the sides and the fresh air will come in over the top. Have plenty of windows and do not be afraid to keep them open.

Summer management.— Follow the feeding schedule until the calf is about six weeks old, and at that time move it to the summer yarding system, which is a row of houses and yards, one for each calf. Each house is raised about six inches above the ground and placed on runners so that it can be easily moved to a new location. The floor is of tight construction and slanting so that it will drain to an outlet in one corner. The inside of the house need not be finished off, but the sharp corners of the uprights should be rounded, and always kept freshly whitewashed. A space of about 12 inches just under the roof should be left open in the back of each house for ventilation. A rack is made for the water pail and feed boxes, about 18 inches above the floor, and arranged so that these can be removed for cleaning. The door opening is fitted with a Dutch door, which is used only in early spring. When the young calves are first turned out they do not know enough to go into the houses and must be locked in every night and during heavy storms, until they have learnt to go in of their own accord. The most convenient

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fencing is a hurdle fence built in eight foot sections and removable. In one corner of the yard a hay rack is built of two inch strips placed vertically about five inches apart. This prevents the hay from spreading around the yard and wasting. The calves are kept in these yards during the period that they are being fed on skim milk, and the yards are in use from early spring until late fall. The fresh air and exercise that the calves get in this way prepares them for a more confined winter. It is advisable to change the small yards at least once during the summer. This can be done very easily by changing the fences to the opposite side of the houses. After the yards have been used for three or four months the ground gets sour and stale. The calves will nibble at the dirt, and this may cause scours or indigestion, which, while not fatal, will retard their growth. When the yards have been changed, the old yard should be plowed, limed and reseeded.

When the calves are about six months old they are transferred to a pasture lot and allowed to run around together. There should be plenty of shade and one or two open sheds in this lot, for shelter.

Winter management.—The same feeding schedule is used in both summer and winter. The calves are also started in separate box stalls as in the summer but remain in these stalls until they are three months old, at which time they are moved to the calf barn stalls and either fastened in the stanchions, which are adjustable and can be regulated to five different sizes, or tied with halter and

rope. They are kept in these stanchions until in the spring the weather is sufficiently warm to turn them out on pasture.

Fresh air and exercise are just as important in the winter as in the summer — fresh air all the time and exercise at least once a day. On clear days when the ground is hard the calves should be turned out in an exercising yard and allowed to romp and kick out their legs. The length of time for them to remain out will depend upon the temperature. Do not let them get over-chilled.

For stormy weather when they cannot safely be turned out of doors there is usually an empty barn floor of sufficient size to turn the calves loose or, if possible, an exercising shed with dirt floor, plenty of sunlight and good ventilation should be used.

In turning them out do not simply unfasten the stanchions and let them run out alone, but lead each calf out with a rope; they soon get so that they will go anywhere willingly. There is nothing meaner or harder to manage than a cow or bull that has never been halter broken.

It adds greatly to the appearance of an animal, and in many cases adds to the value, if the horns are symmetrical. If trainers are improperly used, or none used at all, many cows will develop horns shaped like a steer's, or horns that shoot straight out sideways. If the trainers are properly used the horns can be formed in any shape desired.

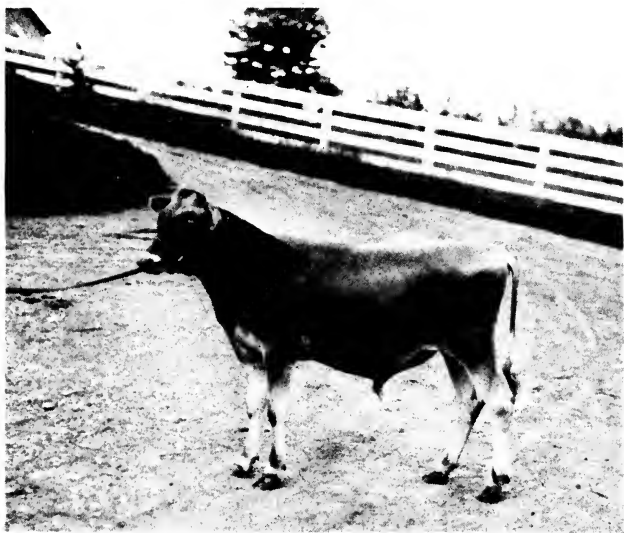
The trainers should be put in place when the horns are from one to two inches long, but not before

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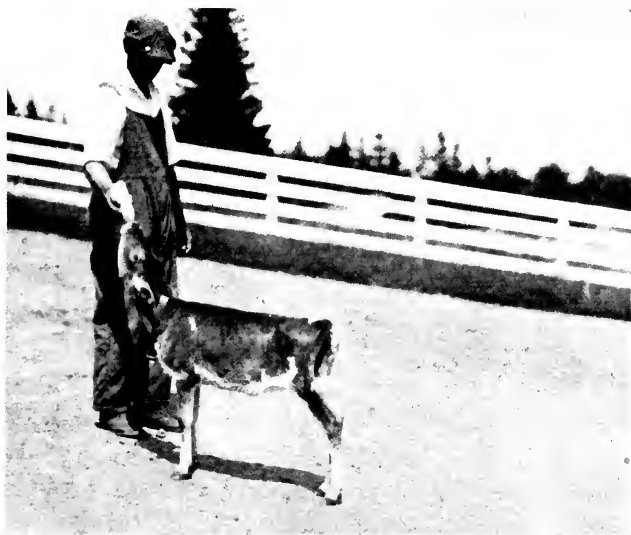
the horns are set; to make sure of this work the horns with your fingers. If you can work them around like a loose tooth, wait a little longer before applying the trainers. After they have been attached tighten them every day, so that the tips of the horns that extend beyond the trainer are drawn almost at right angles to the base of the horns. When this has been accomplished, remove the trainer. After the horn has grown two or three inches longer, if it does not seem to be turning in at the proper angle, bore small holes through the horns near the tips and connect them with a double piece of bale wire. This wire should be tightened often enough to eventually draw the tips closer together. If the horns are turning up too much, wrap a piece of sheet lead around the wires, the weight of which tends to draw the horns down, then get busy with the file and sandpaper to smooth off the rough spots and angles.

Heifers from six months old until calving. — The heifer calves from early spring until late fall are kept on pasture all the time. If grass is plentiful they will not require very much of anything else to eat. We keep a small rack full of alfalfa hay accessible to the calves, and also give them a small quantity of the calf ration each day, just enough to keep them in good condition. A little salt is sprinkled in the feed, and they always have access to fresh water.

In the winter the heifers are kept in stanchions and are exercised daily. They are fed 2 or 3 pounds of calf ration and from 8 to 12 pounds of silage, to-



CALF EIGHT MONTHS OLD



CALF NURSING WITH BOTTLE

gether with all the hay that they will consume. The condition of the heifers should be watched just as closely as that of the young calves.

Great care should be taken in changing the heifers from winter quarters to pasture. It will pay to wait until the grass has a good start, the weather is settled, and the ground is dry, before turning them out. The change should be made gradually, starting with a few minutes only and leaving the animals out a little longer each day, until at the end of two weeks they can be left out altogether. During this time gradually decrease the grain and roughage until they are being fed as above.

The heifers are bred to freshen when they are about two years old. When they are 18 months of age their grain is changed from calf ration to dry cow ration, and at this time begin to put on the finishing touches, not only for calving, but for the first milk test. The quantity of grain to feed depends upon the condition of the animal and the amount of fat on her body. We always have a cow somewhat over normal weight at the time of calving. The first few months she will lose most of this surplus fat, and from then on should at least hold her normal weight. It is very noticeable that a fresh cow in poor flesh, even though known to be a high producer, will not do justice to herself.

Up to the age of two years, a heifer raised by this method will consume, in addition to pasturage, the following: Whole Milk, 230 pounds; Skim Milk, 1846 pounds; Hay, 1400 pounds; Grain, 1000 pounds; Silage, 2000 pounds.

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In selecting cows for our herd we select the best for both production and type. We know that if a calf is neglected or has had setbacks, she will not develop to the best cow for either production or type, so why should we not, whether it is for our own or some other herd, pay close attention to details, and raise the best calf possible, one that will pay for itself in the shortest possible time?

Shipping Calves By Express. — We very seldom ship calves that are less than three months old, as there is a greater risk in shipping them under this age. We want to be sure that the calf has a good start and is accustomed to eating grain. Once they have reached this stage, the calves can be shipped almost anywhere unaccompanied, if they are in good condition and properly crated, with instructions for their feed and care.

The accompanying illustration is a diagram of the crate that we use. It is built very strong but not excessively heavy. The back of the crate is closed, after the calf is in, by dropping the back boards from the top through openings slightly larger than the boards, which, when in place, fit snugly in a pocket in the floor. They are held firmly by a bolt fastened with a thumb screw, so that if for any reason it should be necessary to remove the calf during transit the thumb screw could be taken off and the slats removed by lifting from the top. In the front there is a door, with metal or leather strap hinges, large enough to admit a pail for water and grain. The floor should be well supplied with bedding.

With each crate we ship one pail, one bag of feed and one bag of hay. The feed should be a calf ration that will keep the bowels in good condition, and the instructions for feeding should be for about one half or two thirds of the usual amount fed. The calf will not suffer except from hunger if it is underfed for a few days during shipment, but overfeeding may result seriously. If the calf is being fed skim milk this can be discontinued until the arrival at its destination; the grain, hay and water will supply its wants during transit. A letter of instructions is mailed before the calf is shipped, so that upon its arrival the buyer will know just how it has been fed.

We tack two or three cards on each crate with the following instructions for the express agent.

Please feed me as follows:

<i>Morning</i>	Grain	one pint.
	Water	all I want.
	Hay	what I will clean up.
<i>Noon</i>	Water	
<i>Night</i>	Grain	one pint.
	Water	all I want.
	Hay	what I will clean up.

CALF SCHEDULE

Let calf remain with mother not over twenty-four hours after born. Feed calf mother's milk for the first ten days, as follows: 2 lbs. whole milk and $\frac{1}{2}$ pound skim milk three times a day; feed milk at temperature of 98 degrees and weigh the milk.

After the first ten days, feed the regular herd milk and gradually increase to about 4 pounds to a feed, twice a day, at the end of fifteen days, mixing

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as follows: $3\frac{1}{2}$ pounds whole milk, $\frac{1}{2}$ pound skim milk; feed this amount until skim milk is substituted at from four to six weeks old, depending upon the progress of the calf, the change to be made gradually (about one week). During this time the calf will begin to eat hay and some grain. Do not feed alfalfa or clover to young calves; feed only mixed timothy and field grasses until six months old.

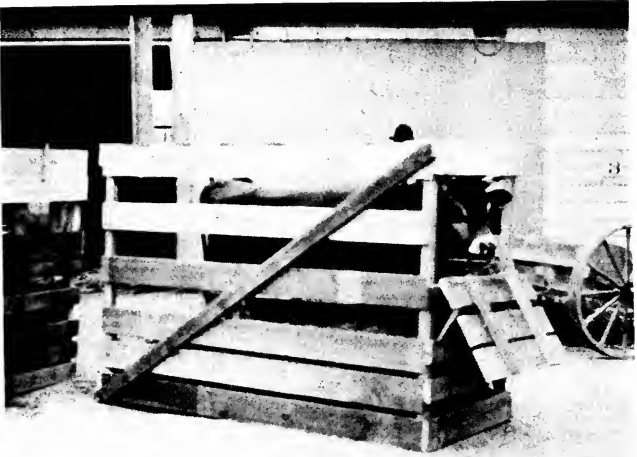
5 lbs. skim milk to a feed, when 8 weeks old.

6	"	"	"	"	"	"	9	"	"
7	"	"	"	"	"	"	10	"	"
8	"	"	"	"	"	"	12	"	"
8	"	"	"	"	"	"	14	"	"
9	"	"	"	"	"	"	16	"	"
9	"	"	"	"	"	"	18	"	"
9	"	"	"	"	"	"	20	"	"
9	"	"	"	"	"	"	22	"	"
9	"	"	"	"	"	"	24	"	"

Feed all of the grain that calf will clean up with relish, between milk feedings, until six months old. After that feed two or three pounds of the following ration per day until eighteen months old:

	<i>Parts by weight</i>
Corn Meal.....	3
Ground Oats.....	3
Wheat Bran.....	1
Oil Meal.....	1

Pay close attention to details. When the calf shows signs of scouring, cut down feed supply, in particular the amount of milk in half. If sudden attack, take all of the milk away for a feed or two, and give Castor Oil, 1 to 3 ozs. in a pint of milk (according to size of calf).



CRATE FOR SHIPPING CALVES



PASTURE SHOWING OPEN SHEDS

Calves from Birth until Two Years 25

Give warm water to drink two or three times per day after the third week. Exercise the calves every day. Lead bull calves every day. Pails, mangers, and feed boxes should be cleaned and sterilized every day. Wash calf's navel with Iodine a short while after calf is born. Sprinkle a little salt in feed once each day. In the winter do not have temperature in calf barn above 50 degrees, and always keep the ventilators wide open.

CHAPTER III

FEEDING

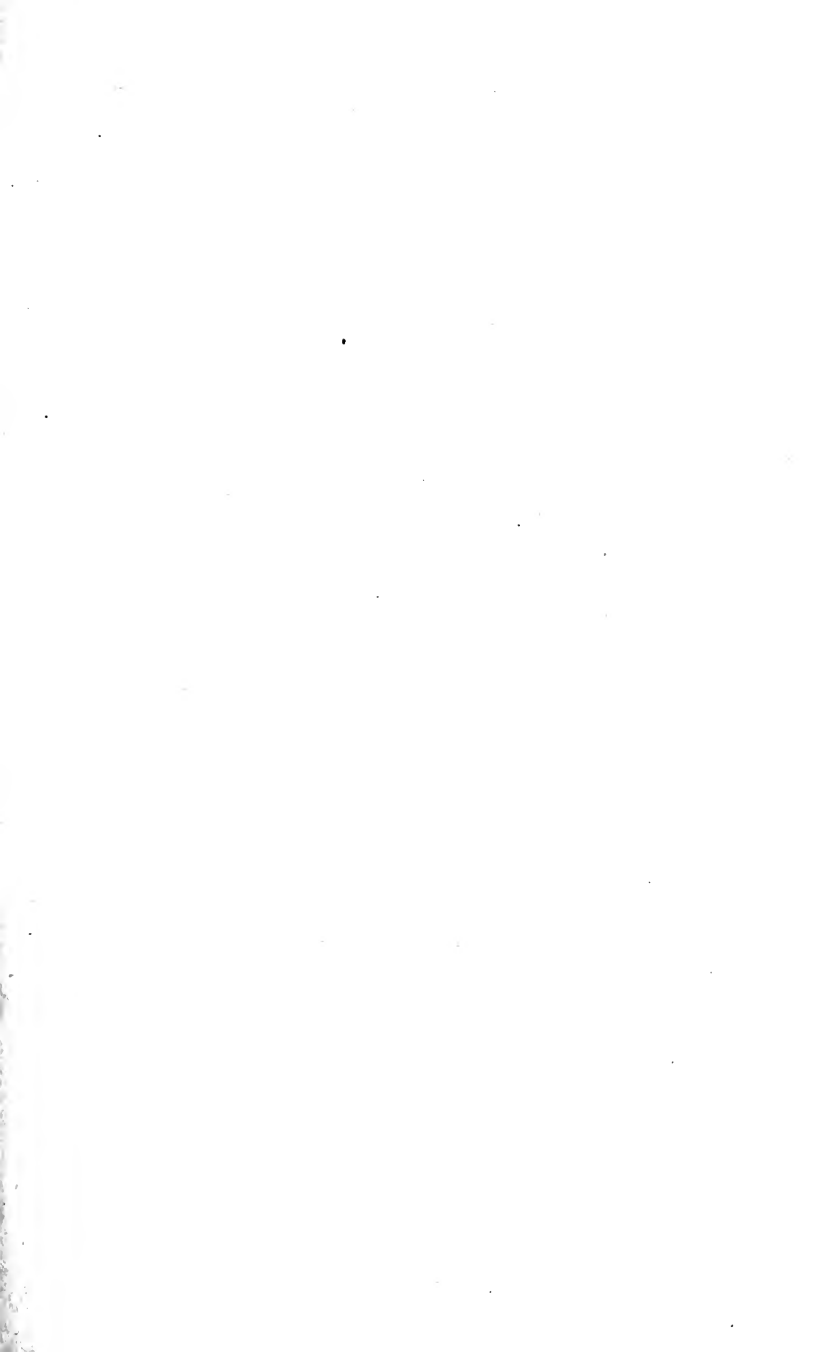
FACTORS *essential to milk production.* — In order to secure the maximum results in the production of milk, other conditions being equal, it is essential to pay due attention to the following three factors, in addition to selection and breeding:

First, the best possible ration.

Second, the judgment and ability of the feeder.

Third, the thoroughness and efficiency of the milkers.

We shall not get the best results if any of these factors fall short of the highest standard. They can be compared to a fleet of several battleships that are steaming away at sea, closely followed by the enemy. One of the ships does not have the speed of the others, so the six faster ones have to hold back for the slower one. We may have a good ration and good milkers, but if the feeder uses poor judgment, the production may be held back on account of this one factor that falls short of the standard. Worse than this, the neglect of that one factor may cause udder trouble, sick cows, weak calves, and shy breeders. If we were to look closely into the history





OXFORD WEXFORD SPOT

(Winner of A. J. C. C. Gold Medal for production in 1918, and in 1919 won the honor of being the highest testing imported cow)

of some exceptional records of milk production, we should find that they have been gained by sacrificing good cows and even an entire herd, so far as breeding is concerned. It is not the cow that makes 60 or 70 or 80 pounds of milk per day, for the first week or month, that wins out, but the one that strikes her true average, and holds it all through the 12 months of her test. Records are made during the last few months of the test.

The best feed.—The ideal feed is a balanced ration that will produce the maximum amount of milk and butter fat, per dollar invested, and at the same time keep the cow in good condition. It is hard to suggest a grain ration that would suit every locality, as the conditions differ so widely. The ration that we have used to produce our Register of Merit records is as follows:

100 pounds Corn Meal (or Hominy Meal)
100 pounds Ground Oats.
100 pounds Wheat Bran.
75 pounds Linseed oil meal.
50 pounds Cottonseed Meal.
30 pounds Gluten Meal.
60 pounds dried Beet-pulp.

In addition to this, use soiling crops, silage, roots and alfalfa hay. The grain ration is elastic, and is so adjusted that the nutritive ratio will always remain about the same. For instance in the fall of the year when we change from a legume soiling crop to corn silage we thereby increase the amount of carbohydrates in the total ration, and to maintain about the same N. R. as before we increase the protein in

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the grain ration, by increasing the amount of Oil Meal and Cottonseed Meal. Our N. R. varies with the feed given to different cows, running from 1:4.5 to 1:5.2, according to the condition and requirements of the individual. If you are sure that you have selected a good grain ration there are no advantages to be gained by changing it, unless a certain grain has advanced in price beyond its value as a feed, and a good substitute can be found. On the other hand if you have proved by experiment that you can better your results by changing the ration, it would be folly not to do so. Get a good ration and stick to it.

In order to ascertain the proper proportion of each feed to use in balancing a ration, we should be familiar with the analysis of the different feeds, and the requirements, for the animals, of the different elements contained in these feeds.

The dairy cow needs its feed primarily for two purposes: First, for body maintenance. Second, for the production of milk. A comparison of the utilization of the feed given to (1) a good cow, and (2) a poor cow, is as follows:

(1) Good cow,	<i>Maintenance</i>	<i>Milk production</i>
	35% of ration.	65% of ration.
(2) Poor cow,	<i>Maintenance</i>	<i>Milk production</i>
	55.8% of ration.	44.2% of ration.

According to Wolff's feeding standard, the dry matter and digestible nutrients required for maintenance and production are as follows:

Digestible

Milk cows when yielding daily 27.5 pounds	Dry matter, pounds	Protein, pounds	Carbohydrates + (fat $\times 2.25$) pounds	Total pounds	Nutritive ratio
milk	32	3.3	14.8	18.1	1:4.5
average milk cows	24	2.5	13.4	15.9	1:5.4

Digestible nutrients in one pound of various feeding stuffs:

Kind of Food

<i>Cured roughage</i>	<i>Total Dry Matter</i>	<i>Crude Protein</i>	<i>Carbo- hydrates</i>	<i>Fat</i>
Fodder Corn (drilled) . . . . .	.76	.037	.41	.015
Corn Stover . . . . .	.59	.014	.31	.007
Sorghum Fodder . . . . .	.50	.024	.32	.016
Millet . . . . .	.86	.050	.47	.011
Timothy . . . . .	.87	.028	.43	.014
Red Top . . . . .	.91	.048	.47	.010
Prairie (upland) . . . . .	.87	.03	.42	.014
Prairie (mixed) . . . . .	.84	.029	.41	.012
Prairie (swale) . . . . .	.86	.026	.42	.011
Barley Hay . . . . .	.85	.057	.44	.01
Oat Hay . . . . .	.86	.047	.37	.017
Pea Hay . . . . .	.90	.080	.41	.017
Cow Pea Hay . . . . .	.89	.058	.39	.013
Soy Bean Hay . . . . .	.88	.106	.41	.012
White Clover Hay . . . . .	.90	.115	.42	.015
Red Clover Hay . . . . .	.85	.071	.38	.012
Alsike Clover Hay . . . . .	.90	.084	.42	.015
Alfalfa Hay . . . . .	.94	.117	.41	.01
Wheat Straw . . . . .	.90	.008	.35	.004
Oat Straw . . . . .	.91	.013	.39	.008
Barley Straw . . . . .	.86	.009	.40	.006
Kafir Forage48	.009	.26	.011
Oat and Pea Hay89	.076	.41	.015
Oat and Vetch85	.083	.36	.013

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<i>Silage</i>	<i>Total Dry Matter</i>	<i>Crude Protein</i>	<i>Carbo- hydrates</i>	<i>Fat</i>
Corn.....	.26	.012	.14	.007
Sorghum.....	.24	.001	.13	.002
Clover.....	.28	.020	.13	.010
Alfalfa.....	.27	.030	.08	.019
Cow Pea.....	.21	.015	.09	.009
Soy Bean.....	.26	.027	.09	.013
Pea Cannery Refuse.....	.23	.021	.13	.008
Corn Cannery Refuse.....	.21	.003	.12	.006
<i>Roots and Tubers</i>				
Carrots.....	.11	.008	.08	.002
Potato.....	.21	.011	.16	.001
Sugar Beet.....	.13	.013	.10	.001
Common Beet.....	.11	.012	.08	.001
Mangel.....	.09	.010	.05	.002
Rutabaga.....	.11	.010	.08	.002
Flat Turnip.....	.10	.009	.06	.001
Wet Beet Pulp.....	.10	.005	.08	.000
<i>Concentrates</i>				
<i>(Ground Grains and By-products)</i>				
Corn.....	.89	.079	.67	.43
Barley.....	.89	.087	.65	.016
Oats.....	.90	.107	.50	.038
Wheat.....	.89	.088	.67	.015
Wheat Bran.....	.88	.119	.42	.025
Flour Wheat Middlings.....	.90	.17	.54	.041
Wheat Shorts.....	.89	.130	.46	.045
Red Dog Flour.....	.90	.162	.57	.034
Emmer (Speltz).....	.92	.10	.70	.02
Corn and Cob Meal.....	.85	.044	.60	.029
Kaffir Corn.....	.90	.052	.44	.014
Sorghum Seed.....	.87	.045	.61	.028
Buckwheat Bran.....	.92	.059	.34	.02
Buckwheat Middlings.....	.87	.227	.37	.061
Rye Bran.....	.88	.112	.47	.020
Rye Middlings.....	.88	.110	.53	.026
Millet.....	.88	.071	.48	.025
Hominy Feed.....	.90	.068	.60	.074
Corn Oil Meal.....	.91	.158	.39	.108
Bean Meal.....	.89	.202	.42	.013

Cow-Pea Meal.....	.85	.168	.55	.011
Soy Bean Meal.....	.88	.291	.23	.146
Gluten Feed.....	.91	.213	.53	.029
Gluten Meal.....	.90	.297	.42	.061
Linseed Meal.....	.90	.302	.32	.069
Cottonseed Meal.....	.93	.376	.21	.096
Flaxseed.....	.91	.206	.17	.290
Tankage.....	.930	.501	.00	.116
Brewers Grain-Dry.....	.91	.200	.32	.060
Malt Sprouts.....	.90	.203	.46	.014
Distillery Grains, dry.....	.92	.228	.40	.116
Dried Beet Pulp.....	.92	.041	.65	.000

Fresh Green Roughage

Corn, fodder, all analyses.....	.219	.010	.128	.004
Sweet corn fodder before milk stage	.100	.008	.061	.002
Corn Stover, Green ears removed	.227	.005	.120	.002
Sugar Cane.....	.217	.004	.123	.006
Bluegrass, Kentucky, all analyses	.316	.023	.148	.006
Brome Grass, smooth.....	.330	.029	.150	.002
Millet, Hungarian.....	.276	.019	.148	.006

Mixed Grasses

Mixed Grasses, immature.....	.297	.036	.145	.009
Rye Grass, Italian.....	.271	.018	.127	.007
Rye Grass, perennial.....	.266	.017	.125	.007
Timothy, all analyses.....	.375	.015	.193	.006
Oat fodder.....	.261	.023	.118	.008
Oat fodder, 8 in. high.....	.130	.034	.041	.005
Rye fodder.....	.213	.021	.122	.005
Rye fodder, 5 in. high.....	.181	.051	.62	.007
Wheat fodder, all analyses.....	.274	.028	.151	.006
Alfalfa, all analyses.....	.253	.033	.104	.004
Clover, Alsike.....	.243	.027	.118	.004
Clover, crimson.....	.174	.023	.081	.004
Clover, red, all analyses.....	.262	.027	.130	.006
Cowpeas.....	.163	.023	.080	.003
Peas, field, Canada.....	.166	.029	.071	.003
Soybeans, all analyses.....	.236	.032	.102	.005
Velvet bean.....	.179	.027	.072	.004
Vetch, common.....	.204	.027	.089	.003
Vetch, hairy.....	.181	.035	.081	.004

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Mixed legumes and grasses

Clover and mixed grasses273	.022	.141	.006
Cowpeas and Corn200	.013	.114	.003
Cowpeas and Oats . . . . .	.218	.033	.091	.006
Cowpeas and sorghum . . . . .	.187	.007	.100	.003
Peas and millet . . . . .	.197	.019	.084	.008
Peas and Barley . . . . .	.202	.027	.088	.005
Peas and Oats . . . . .	.226	.024	.106	.006
Peas, oats and Rape . . . . .	.179	.023	.073	.005
Soybeans and Corn . . . . .	.238	.017	.136	.006
Soybeans and Kafir . . . . .	.171	.009	.079	.004
Vetch and Barley . . . . .	.200	.021	.105	.002
Vetch and Oats . . . . .	.265	.028	.133	.004
Vetch and Wheat . . . . .	.227	.024	.122	.003

The other requirements of a ration are:

1. It must contain sufficient food nutrients in the right proportion, which means the correct proportion of dry matter, protein and carbohydrates. The ratio of protein to carbohydrates is commonly spoken of as the "nutritive ratio," thus, to say that the nutritive ratio of a given feed is 1: 5.4 means that there is one part of protein to 5.4 parts of carbohydrates in the feed.

2. It must have sufficient bulk. Hence the use of roughage, etc.

3. It must be palatable. Aids in this direction are the addition of Molasses water, Beet-Pulp, Salt, Moistening, Steaming, etc.

4. There must be a certain degree of variety. This is ensured by using a variety, or mixture of several feeds.

5. Cows require succulent food. (Silage, Soiling Crops, Wet Beet-Pulp, Molasses, Roots, etc.)

6. The feed must be economical. This does not mean that a cheap feed is to be used.

7. There must be a certain amount of ash (Mineral Matter) in the food, (Alfalfa, Bran, etc.)

8. The cows also require salt and water in their food.

We now know, according to the above standards, the feed requirements for the average milk cow, the analyses of the feeds, and the other requirements of a balanced ration. The next step is to determine the feeds to use, according to their availability, making use of home-grown feeds as far as possible.

As an example we will select the feeds mentioned for the test ration on page 34, for a cow that is milking 25 pounds a day. We make a list of the feed (see test ration, page 34), and so proportion the weights of grain that the total weight will be 10.3 pounds, which is the average portion fed to each cow daily in addition to the roughage. We then refer to the table (Page 29) and figure the amounts of dry matter, protein and carbohydrates plus fat that are contained in each feed, and enter the amounts in the correct columns. In adding these columns we find that we have 24.79 pounds of dry matter, 3.066 pounds of protein, 12.518 pounds of carbohydrates, and 1.442 pounds of fat. This latter is converted into the equivalent weight of carbohydrates by multiplying by 2.25, and the result 3.244 is added to the carbohydrates, making the total 15.762 pounds. We then find by dividing that our nutritive ratio is 1 part of protein to 5.14 parts of carbohydrates. The carbohydrate content is slightly higher than the Wolff standard, but as this is a winter ration it is purposely thus proportioned on

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account of the severe weather in our locality, and the necessity of the cows having to furnish more body heat to keep them warm.

<i>Pounds</i>	<i>Feed</i>	<i>Dry Matter</i>	<i>Protein</i>	<i>Carbohydrates</i>	<i>Fat</i>
2	Corn Meal	1.780	.158	1.34	.86
2	Ground Oats	1.80	.214	1.00	.076
2	Wheat Bran	1.76	.238	.84	.050
1.5	Oil Meal	1.35	.453	.48	.103
1	Cottonseed M	.93	.376	.210	.096
.6	Gluten Feed	.546	.127	.318	.017
1.2	Beet Pulp, dry	1.104	.049	.780	.000
<hr/>					
10.3					
10	Alfalfa Hay	9.40	1.170	4.10	.10
1	Beet Pulp	.92	.041	.65	.000
20	Corn Silage	5.20	.240	2.80	.140
		<hr/>	<hr/>	<hr/>	<hr/>
		24.790	3.066	12.518	1.442
				<hr/>	<hr/>
				3.244	2½
				<hr/>	<hr/>
				15.762	3.244

$$\frac{15.762}{3.066} = 5.14 = \text{nutritive ratio.}$$

After you have thoroughly studied the methods of balancing a ration, see if you can work out correctly the nutritive ratio of the above ration without referring to the analysis of the feeds as worked out on this chart, but write the name and weights of the different feeds, and figure your analyses from the chart (page 29).

After this has been successfully accomplished, figure the Nutritive Ratio for summer use, by substituting for the corn silage. Oat and Pea hay cut green, as a soiling crop. Also, reduce the oil meal and cottonseed meal, as the Oat and Pea hay contain more protein in proportion than the corn silage. It also improves the ration to increase the gluten

BROOKWOOD FARMS JERSEY HERD

Milk Production of Oxforda Wexford Spot No. 289466Month of May 1919 Test begun November 10, 1918

DATE	MILK								REMARKS	
	Morning		Noon		Evening		Total for Day			
No.	Lbs.	10ths	Lbs.	10ths	Lbs.	10ths	Lbs.	10ths	AGGREGATE TOTAL	
12.4	11	5	12	5	12	5	49	0		
12.5	11	6	12	5	13	2	50	2	99	2
12.6	12	8	11	6	11	8	46	4	147	6
12.7	12	5	12	6	11	5	49	6	197	2
12.8	13	8	11	0	12	3	49	4	246	6
12.9	11	8	13	4	12	4	50	8	297	4
12.6	13	7	11	2	14	3	51	8	348	2
10.5	12	0	15	2	12	0	49	7	398	9
9										
10										
11										
12										
13										
14										
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16										
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18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
Total Milk for Month										
Average Percentage of Fat										
Total Estimated Fat for Month										

Monthly Milk Record Forms'

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feed. Work out the following summer ration in the same manner that you figured the winter ration. When you have successfully mastered this, you should be qualified to figure out a proper nutritive ratio for other feeds and proportions.

<i>Pounds</i>	<i>Feed</i>	<i>Dry Matter</i>	<i>Protein</i>	<i>Carbohydrates</i>	<i>Fat</i>
2	Corn Meal	1.780	.158	1.34	.860
2	Ground Oats	1.800	.214	1.00	.076
2	Wheat Bran	1.760	.238	.840	.050
1	Oil Meal	.900	.302	.320	.069
.6	Cottonseed	.558	.225	.126	.057
1	Gluten Feed	.910	.213	.530	.029
1.2	Beet Pulp	1.104	.049	.780	.000
<u>9.8</u>					
10.0	Alfalfa	9.400	1.170	4.100	.100
1	Beet Pulp	.920	.041	.650	.000
20	Peas and Oats	4.520	.480	2.120	.120
		<u>23.652</u>	<u>3.090</u>	<u>11.806</u>	<u>1.361</u>
				<u>3.062</u>	<u>2.25</u>
				14.868	3.062

$$\frac{14.868}{3.090} = 4.81 = \text{nutritive ratio.}$$

These rations act as a guide and starter for the feeder, and as a convenience in mixing the feed in quantities to last the entire herd for several days. The methods of feeding and the individual requirements of each cow are just as important to consider as is the guide ration.

Ability and judgment of the feeder.—There is a limit or safety point of feeding and production for every cow. The question to determine is, what is that limit or safety point? Probably two of the hardest things for the feeder to do are: (1) To stop increasing the feed given to a cow when she has

REGISTER OF MERIT RECORD.

Test started Nov. 10, 1918. Test ends Nov. 9, 1919. R. of M. No. _____

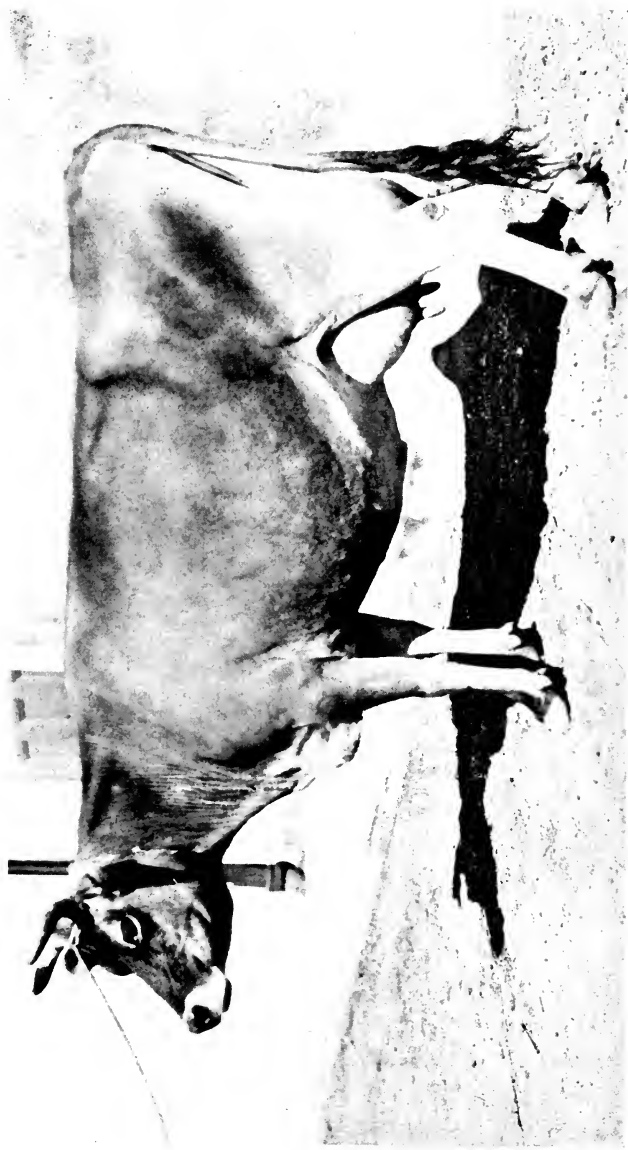
Yearly Milk Record Forms

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reached her safety point, and (2) To reduce, or take the feed entirely away from the cow at the first least sign of a drop in milk, or of being off feed.

We may, by the way of illustration, consider first of all the case of a cow that by forcing would give 55 pounds of milk per day. She may hold that level for one week or one month, but is being forced over the safety point of feeding, and the break in production is sure to come. It would be best in this case to hold the cow at 52 or 53 pounds per day by giving less feed. She would then have a much better chance to hold this average for four or five months, and, as she advances in lactation period, to show a slow, gradual decrease in milk flow. There is no doubt but that the amount of feed given greatly influences the production, but after a certain amount has been consumed, further increase of feed ceases to augment the flow. We have proved to our own satisfaction, with a cow that was apparently milking very well but seemed to be fed too heavily, that reducing her feed a pound or two resulted in absolutely no drop in production, and in some instances it has even resulted in an increase in milk flow on the lessened amount of grain. Which demonstrates that big yearly records are not made by cramming the cow with feed, but by liberal feeding, the ability of the cow to transform that feed into milk, and the ability and judgment of the feeder in catching her at the safety point, and holding her level.

As a second illustration, a cow has been holding her level of production, but shows a drop in pro-



JESSIE'S PLYMOUTH

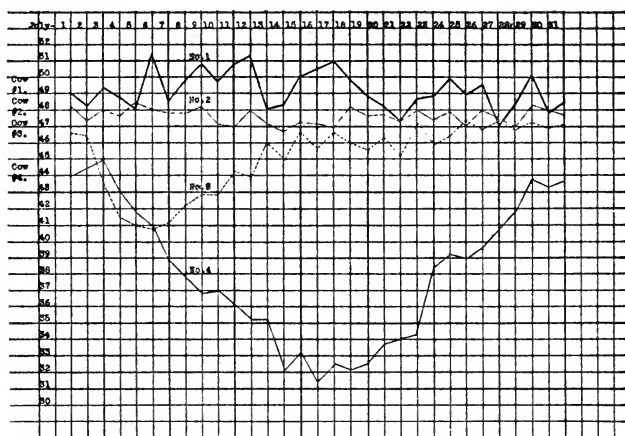
(Winner of A. J. C. C. Gold Medal for production, 13904.2 lbs. milk, 700.03 lbs. butter fat)

duction on a certain day, of three or four pounds below her usual average. Of course it is hard for a feeder to see his cow giving less milk, as he is greatly interested in having her make a good test; so, being overanxious, instead of taking one half or all of the feed away, he tries to jolly her along, and possibly gives her more grain to bring her back, and knocks her completely off. A cow that is slightly off condition, or shows by other symptoms that she is getting ready for a drop in milk, will always give warning. If the feeder is experienced and watchful, he will detect these warnings, and usually catch the cow in time to prevent the drop. There are some cases, however, that come on suddenly and practically without warning, such as toxemia, a protein poisoning or form of auto-intoxication. This occurs frequently in cows that are on test and where the feeder inadvertently oversteps the safety point. The symptoms are almost identical with those of milk fever, and the treatment is the same. About four hours after recovery from the acute symptoms there is a rise in temperature to about 105 degrees, and the pulse is very rapid. At this time the cow should have treatment to relieve these conditions.

This milk chart illustrates how these warnings can be detected. Each square from left to right represents one day, each square from bottom to top a pound of milk. The sheet should be long enough for one year or 365 squares, and deep enough to compare four cows together. The cow represented by the heavy line has made an exceptionally good record, and before the results of the other cows are

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recorded, we insert this one complete for the year in red ink; then each day we enter the other three, one in a solid black line, one a dotted line, and the third by dot and dash. Each break of over two pounds we consider as a warning. It is not always the sign of a break, but the sign to watch the cow very closely. The next day she may strike her average,



*Milk Chart Showing Comparison of Four Cows on test
Emphasizing the Importance of the "Safety Point"*

but should she go down still more the second day, it is time for action. As an example of the use of the chart, cow No. 1 has completed a very good test, and her milk scale has been marked on the chart for the whole year, to be used as a comparison. Cow No. 4 has been milking very well, but has been fed or forced a little over the safety point. On the third day the feeder had warning to watch her, and on the fourth, notice to take action. The feeder, being overanxious, took action the wrong way by

increasing the feed, which resulted in a large salient in the chart. Cow No. 3 on the second day gave warning. In this case the feeder paid heed to that warning and watched her very closely. On the morning of the third day he took action by withdrawing most of the feed and giving a dose of epsom salts. On this day she lost about two pounds more of milk, but on the fourth and fifth days she about held her own, showing that the feeder had her under control. With a slight increase in feed each day she gradually came back to her true level, but never received as much feed as she had been getting previous to the break. The number of squares between the lines representing No. 3 and No. 4 cows, show the pounds of milk that would have been saved, had better judgment been used. The best method and display of judgment, however, was used on cow No. 2. She had reached a good level and could have averaged possibly 2 or 3 pounds more per day by forcing, but he held her at her safety point, being willing to sacrifice a short high milking period for a long steady one, and finally a larger total production.

Some cows are higher producers than others. The poorest cow in the herd will not under the best of conditions give over a certain amount of milk, which is usually far less than the average herd production. She has demonstrated, if we have been watchful, that she has reached the limit of her production, and probably does not pay for her keep. On the other hand the best cow may not produce much more than the limit of the poorest if there is a break in the

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efficiency of our combination of feed, feeder and milker. A heifer that does not make good the first year deserves another trial, as the chances are that she will do better later on, but a cow four or five years old that does not pay for her keep is just as bad as milking a good cow into a leaky bucket.

The cows are fed as individuals and not as a herd, so that the requirements and the likes and dislikes of each individual cow must be studied. The practice of wheeling the feed cart down the passage in front of the mangers, guessing the amount of feed required by each cow and throwing it in with a scoop, is not only wasteful but it is not fair to the cow. Some cows will get more than their actual needs, and some less. One-quarter of a pound more or less seems hardly enough to bother about, but in a herd it will amount to quite an item in a few months' time.

If the cow is getting overfat on the feed that she is consuming, we first reduce her allowance a little. If this causes a reduction in milk flow we go back to the original amount, and narrow the ration by substituting possibly a little more oil meal, or if the cow is getting thin we either increase the amount, or widen the ration by adding more Corn Meal. She may like her feed either dry or sloppy, or she may like her silage and beet-pulp fed separate better than mixed with the grain. Most cows, however, form the habit of being served a certain way, and it is the exception rather than the rule to have to do more than either widen or narrow the ration, or increase or lessen the amount.



DOROTHY'S NOBLE FERN
253250 A.J.C.C.

EDWIN MEGARGEY

(Daughter of Golden Fern's Noble, Official record: 11,066.4 lbs. milk and 703.61 lbs. fat)

The feed truck is divided in two compartments, one for milk ration and one for dry cow ration. Above the truck is a frame high enough to hold the feed scales and a pail. To the left of the scales is a list containing the names of all the cows, and the amount to feed to each. On the left of the cart is a box containing salt. From one to three ounces are mixed with the feed of each cow daily, depending upon the amount of milk produced. The two pans in back of the frame are for oil meal and corn meal.

The feed cart is never taken into the cow barn, the feed being prepared as follows: The pails are placed on the platform truck in rotation, so that the feeder knows which cow each pail is for, and are filled about one quarter full of water. To this is added about one pint of molasses water, which is mixed by diluting one quart of molasses in twelve quarts of water. The feed is moistened with this solution mainly because the cows find it more palatable that way, and by experiment we know that we can thus secure better results than by dry feeding. After the water and molasses are ready the feeder refers to the chart. Number 1 cow, for instance, will get four pounds of regular milk ration per feed. This is weighed out accurately and poured in number 1 pail, and stirred in the molasses solution with a wooden paddle by an assistant. Number 2 cow is to get 4 pounds of milk ration and $\frac{1}{4}$ pound of oil meal, which is weighed out and mixed as was number one. Number three will get $3\frac{3}{4}$ pounds of milk ration and $\frac{1}{4}$ pound of corn meal. Number 4

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cow is dry and we are trying to make her put on weight, preparatory to calving and the next test; so we feed her the dry cow ration, composed of

200	pounds of	Corn Meal
200	"	" Ground Oats
200	"	" Wheat Bran
100	"	" Oil Meal

After each pail has been filled with the grain ration, the feeder again refers to his chart, weighs out the correct proportion of beet pulp, and pours it on top of the grain in each pail. The truck is then wheeled to the cow barn, and each pail is placed in front of the manger of the cow for which it was mixed. The milkers then dump the feed in the manger, so that each cow is eating while being milked. During the milking period the feeder will watch the cows and note how they will clean up their feed, and check on the milk weights as they are weighed in the milk receiving room. The condition of the dung is also noted frequently. After the cows have all been milked the feeder wheels the truck containing silage into the cow barn and feeds each cow her portion. After the completion of this operation the Alfalfa is brought in on trucks and fed. The weights are estimated approximately by eye.

Our rule is to breed all cows so that they will have a rest period of at least six or eight weeks before calving. It not only helps to put them in better condition for calving, but they will start the test with a higher average, and are likely to be more



GOLDEN FERNS BENEDICTINE
355742. A J C C

(Winner of A. J. C. C. Gold Medal for production. 13050 lbs. milk, 731.27 lbs. fat)

persistent. After the completion of the test, the cows are dried up.

We then commence feeding dry cow ration, the quantity depending upon the weight and condition of the cow at this time, the feed ranging from two to ten pounds per day, also several pounds of corn silage, and all of the hay that she will clean up within a reasonable time. About two weeks before freshening, her feed is gradually reduced, so that the last four or five days she receives only two or three pounds of bran mash per day, and hay as before. At the first sign of calving she is given a dose of epsom salts. The management of the cow at calving time is described in the chapter on calf raising.

After calving and for the first two days the cow is given warm water to drink, and, in addition to all of the hay that she will eat, 2 or 3 pounds of warm bran mash. After the second day start feeding the regular milk ration, about 3 or 4 pounds daily, and increase by from $\frac{1}{2}$ to 1 pound per day for the next six days. Continue feeding this amount for five days or more without an increase. Then if she is doing well increase about $\frac{1}{2}$ pound daily until you think the safety point has been reached. This amount should be continued for several days, and then reduced about 1 pound to determine whether she is consuming more grain than is necessary to hold her level. The silage and beet-pulp should also be gradually increased with the grain.

The cow is started on test the fourth day after calving, and from this time on we use the feeding

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NAME <i>Alford's Waverford 400</i> AGE <i>7 yrs. 237 days</i> TEST-STARTED <i>November 10, 1918</i>															
DAYS IN MILK	DATE	GRAIN	SLUGS	BEST PUP	MILK	GRAIN	SLUGS	BEST PUP	MILK	GRAIN	SLUGS	BEST PUP	MILK	GRAIN	SLUGS
<i>Nov 1-7</i>															
<i>8:14</i>															
<i>8:21</i>	<i>9</i>	<i>8</i>	<i>2</i>	<i>88</i>	<i>9</i>	<i>10</i>	<i>2</i>	<i>390</i>	<i>9</i>	<i>12</i>	<i>2</i>	<i>411</i>	<i>9</i>	<i>12</i>	<i>2</i>
<i>8:28</i>	<i>12</i>	<i>16</i>	<i>2</i>	<i>82</i>	<i>16</i>	<i>16</i>	<i>2</i>	<i>464</i>	<i>14</i>	<i>20</i>	<i>2</i>	<i>479</i>	<i>15</i>	<i>20</i>	<i>2</i>
<i>8:35</i>	<i>16</i>	<i>24</i>	<i>2</i>	<i>84</i>	<i>16</i>	<i>24</i>	<i>2</i>	<i>507</i>	<i>16</i>	<i>24</i>	<i>2</i>	<i>507</i>	<i>16</i>	<i>24</i>	<i>2</i>
<i>TOTALS</i>	<i>37</i>	<i>48</i>	<i>6</i>	<i>38</i>	<i>37</i>	<i>48</i>	<i>6</i>	<i>38</i>	<i>37</i>	<i>48</i>	<i>6</i>	<i>38</i>	<i>37</i>	<i>48</i>	<i>6</i>
<i>Dec 1-7</i>															
<i>8:19</i>	<i>16</i>	<i>24</i>	<i>2</i>	<i>166</i>	<i>16</i>	<i>24</i>	<i>2</i>	<i>166</i>	<i>16</i>	<i>24</i>	<i>2</i>	<i>166</i>	<i>16</i>	<i>24</i>	<i>2</i>
<i>8:26</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>163</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>163</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>163</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:33</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>164</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>164</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>164</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:40</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>171</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>171</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>171</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:47</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>173</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>173</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>173</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:54</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>174</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>174</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>174</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>TOTALS</i>	<i>54</i>	<i>120</i>	<i>10</i>	<i>85</i>	<i>54</i>	<i>120</i>	<i>10</i>	<i>85</i>	<i>54</i>	<i>120</i>	<i>10</i>	<i>85</i>	<i>54</i>	<i>120</i>	<i>10</i>
<i>Jan 1-7</i>															
<i>8:14</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>537</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>537</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>537</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:21</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>560</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>560</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>560</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:28</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>564</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>564</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>564</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:35</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>571</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>571</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>571</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:42</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:49</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>TOTALS</i>	<i>67</i>	<i>120</i>	<i>12</i>	<i>87</i>	<i>67</i>	<i>120</i>	<i>12</i>	<i>87</i>	<i>67</i>	<i>120</i>	<i>12</i>	<i>87</i>	<i>67</i>	<i>120</i>	<i>12</i>
<i>Feb 1-7</i>															
<i>8:14</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>539</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>539</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>539</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:21</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>560</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>560</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>560</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:28</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>564</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>564</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>564</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:35</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>571</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>571</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>571</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:42</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:49</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>TOTALS</i>	<i>67</i>	<i>120</i>	<i>12</i>	<i>87</i>	<i>67</i>	<i>120</i>	<i>12</i>	<i>87</i>	<i>67</i>	<i>120</i>	<i>12</i>	<i>87</i>	<i>67</i>	<i>120</i>	<i>12</i>
<i>Mar 1-7</i>															
<i>8:14</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>539</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>539</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>539</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:21</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>560</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>560</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>560</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:28</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>564</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>564</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>564</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:35</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>571</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>571</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>571</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:42</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:49</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>TOTALS</i>	<i>67</i>	<i>120</i>	<i>12</i>	<i>87</i>	<i>67</i>	<i>120</i>	<i>12</i>	<i>87</i>	<i>67</i>	<i>120</i>	<i>12</i>	<i>87</i>	<i>67</i>	<i>120</i>	<i>12</i>
<i>Apr 1-7</i>															
<i>8:14</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>539</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>539</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>539</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:21</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>560</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>560</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>560</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:28</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>564</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>564</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>564</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:35</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>571</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>571</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>571</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:42</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:49</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>TOTALS</i>	<i>67</i>	<i>120</i>	<i>12</i>	<i>87</i>	<i>67</i>	<i>120</i>	<i>12</i>	<i>87</i>	<i>67</i>	<i>120</i>	<i>12</i>	<i>87</i>	<i>67</i>	<i>120</i>	<i>12</i>
<i>May 1-7</i>															
<i>8:14</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>539</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>539</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>539</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:21</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>560</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>560</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>560</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:28</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>564</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>564</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>564</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:35</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>571</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>571</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>571</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:42</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:49</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>TOTALS</i>	<i>67</i>	<i>120</i>	<i>12</i>	<i>87</i>	<i>67</i>	<i>120</i>	<i>12</i>	<i>87</i>	<i>67</i>	<i>120</i>	<i>12</i>	<i>87</i>	<i>67</i>	<i>120</i>	<i>12</i>
<i>June 1-7</i>															
<i>8:14</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>539</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>539</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>539</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:21</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>560</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>560</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>560</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:28</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>564</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>564</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>564</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:35</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>571</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>571</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>571</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:42</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:49</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>TOTALS</i>	<i>67</i>	<i>120</i>	<i>12</i>	<i>87</i>	<i>67</i>	<i>120</i>	<i>12</i>	<i>87</i>	<i>67</i>	<i>120</i>	<i>12</i>	<i>87</i>	<i>67</i>	<i>120</i>	<i>12</i>
<i>July 1-7</i>															
<i>8:14</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>539</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>539</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>539</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:21</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>560</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>560</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>560</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:28</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>564</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>564</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>564</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:35</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>571</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>571</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>571</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:42</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>8:49</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>	<i>572</i>	<i>17</i>	<i>24</i>	<i>2</i>
<i>TOTALS</i>	<i>67</i>	<i>120</i>	<i>12</i>	<i>87</i>	<i>67</i>	<i>120</i>	<i>12</i>	<i>87</i>	<i>67</i>	<i>120</i>	<i>12</i>	<i>87</i>	<i>67</i>	<i>120</i>	<i>12</i>
YEARLY TOTALS: POUNDS MILK POUNDS FAT NET PROFIT ABOVE COST OF FEED															

TEST ENDER <i>November 2, 1919</i> -----										TOTAL POUNDS FED				TOTAL COST	OF MILK PRODUCED	PERCENT OF TESTER	POUNDS OF FAT
DATE	DAIRY	TEST	MILK	WATER	SLACK	WATER	WATER	WATER	WATER	GRAIN	SLACK	TEST PULP	HAY	OF ALL FEED			
7	5	2	36.4	8	6	2	3.3			2.30	3.04	37	3.00	5.32	2.15	9.07	47.76
10	16	2	44.3	11	16	2	4.1			.013	.006	.025	.02	1.91	QTR.	43.4	13.16
16	24	2	54.6	16	24	2	5.2							6.40	PRICE	10	
23	45	6		35	46	6				5.32	1.07	.89	6.00	12.16	VALUE	47.26	51.67
17	24	2	48.3	17	24	2	4.7			5.32	7.44	62	3.10	14.52	2.15	17.03	79.20
17	24	2	48.3	17	24	2	4.7			.027	.005	.024	.02	2.18	QTR.	79.20	74.59
17	24	2	48.3	17	24	2	4.7							1.39	PRICE	10	
17	24	2	48.3	17	24	2	4.7							6.20			
68	96	8		69	96	8				14.52	2.48	1.39	6.20	24.29	VALUE	79.20	51.67
17	24	2.5	54.6	17	24	2.5	5.3			5.32	7.44	62	3.10	15.09	2.15	16.52	76.83
17	24	2.5	54.6	17	24	2.5	5.3			.027	.006	.024	.02	2.48	QTR.	76.83	75.15
17	24	2.5	54.6	17	24	2.5	5.3							1.39	PRICE	10	
17	24	2.5	54.6	17	24	2.5	5.3							6.20			
69	96	100		69	96	100				15.09	2.48	1.39	6.20	25.15	VALUE	76.83	51.67
17	24	2.5	48.3	17	24	2.5	5.3			8.84	6.72	70	3.80	13.21	2.15	16.10	63.30
17	24	2.5	48.3	17	24	2.5	4.90			.027	.005	.024	.02	2.24	QTR.	63.30	22.72
17	24	2.5	48.3	17	24	2.5	4.90							1.57	PRICE	10	
17	24	2.5	48.3	17	24	2.5	4.90							5.60			
69	96	100		69	96	100				13.51	2.24	1.57	5.60	22.72	VALUE	63.30	40.58
17	24	2.5	57.0	17	24	2.5	4.87			5.27	7.44	62	3.10	14.49	2.15	17.67	67.68
17	24	2.5	57.0	17	24	2.5	4.87			.027	.005	.024	.02	2.48	QTR.	67.68	24.56
17	24	2.5	57.0	17	24	2.5	4.87							1.39	PRICE	10	
17	24	2.5	57.0	17	24	2.5	4.87							6.20			
68	96	100		68	96	100				14.49	2.48	1.39	6.20	24.56	VALUE	67.68	41.12
17	24	2.5	48.3	17	24	2.5	5.24			5.10	7.44	60	3.00	14.07	2.15	14.47	67.38
17	24	2.5	48.3	17	24	2.5	5.24			.027	.005	.024	.02	2.40	QTR.	67.38	70.77
17	24	2.5	48.3	17	24	2.5	5.24							1.35	PRICE	10	
17	24	2.5	48.3	17	24	2.5	5.24							6.00			
68	96	100		68	96	100				14.07	2.40	1.35	6.00	23.77	VALUE	67.38	43.61
															2.15	VALUE	43.61
															QTR.	43.61	51.3
															PRICE		82.46
															VALUE		
															PROFIT		
															2.15	VALUE	
															QTR.		
															PRICE		
															VALUE		
															PROFIT		
															2.15	VALUE	
															QTR.		
															PRICE		
															VALUE		
															PROFIT		
															2.15	VALUE	
															QTR.		
															PRICE		
															VALUE		
															PROFIT		
															2.15	VALUE	
															QTR.		
															PRICE		
															VALUE		
															PROFIT		

of Feed Record Chart

48 Feeding and Management of Dairy Cattle

chart.¹ It takes but a short time each day to keep it up to date, and experience will soon prove that the efficiency of the herd will be greatly increased through its use.

The use of the chart is threefold: *First*, to determine the profitable and unprofitable cows in the herd, by the cost records of all feed consumed, and the value of the milk produced. *Second*, to determine the amounts to feed for the most economical production, and, in official testing, the safety point or maximum amount of feed that it is safe to feed the cow, and still have her hold her level of production. *Third*, to determine the condition of the cow.

To determine profitable and unprofitable cows in the herd.

Four squares on the chart represent one day. The first square is for the total pounds of grain fed on that day. The second square is for the pounds of silage. The third square is for beet-pulp (which is usually soaked, in proportion by weight of three of water to one of pulp), and the fourth square is for the pounds of milk produced. The grain and silage are weighed on scales attached to the feed truck. The weight of hay is estimated by first weighing a sample of the average amount fed, and using that as a basis for the weights. If soiling crops or other feeds are used instead of silage or beet-pulp, these squares can be used for the other feeds. At the end of each month the totals are added on the line

¹ See Feed Record Chart, published separately by Longmans, Green & Co.



SOPHIE'S EMILY

(Winner of A. J. C. C. Gold Medal for production; also entitled to a gold medal for the highest production of butter fat for a cow under 30 months old, 13792.1 lbs. milk, 723.56 lbs. butter fat)

marked Totals, and carried forward to the space marked Total Pounds Fed. If accurate records are not available for the costs of home-grown feeds, the prices should be based on the market quotations. All costs should be reduced to the cost of one pound. Then multiply the total number of pounds fed by the cost of one pound, which gives the cost per month. These amounts are added in the column marked Total Cost of all Feed. This total is carried to the last column opposite the line marked Cost. The total number of pounds of milk produced during the month is entered in the column marked Total Pounds of Milk Produced. If milk is sold by the quart, divide the total pounds of milk by 2.15, the weight (in pounds) of one quart, to find the total quarts produced during the month. This multiplied by the selling price gives the value of the milk produced, which is entered in the last column marked Value. By subtracting the costs from the value, we get the net profit above the cost of feed, which is a fair way to compare and determine the profitable cows, as the labor conditions and wages paid in different localities vary so greatly.

In starting the book every fifth page should be used for a different cow, so that there will be four pages for each one, to be used as a comparative feeding record for four years.

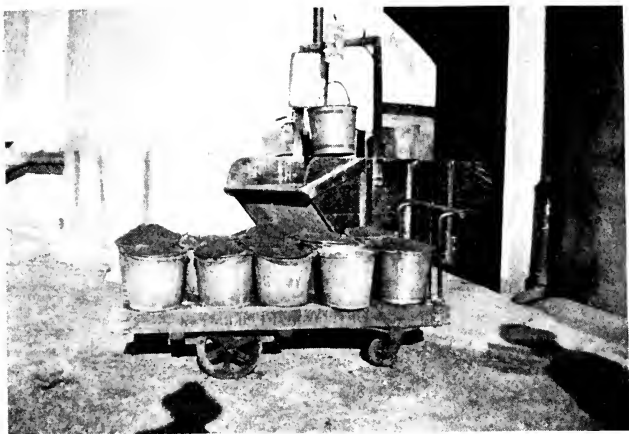
To determine the amounts to feed for the most economical production.

The following feeding schedule should be followed for the first fifteen days, provided the animal is in normal condition:

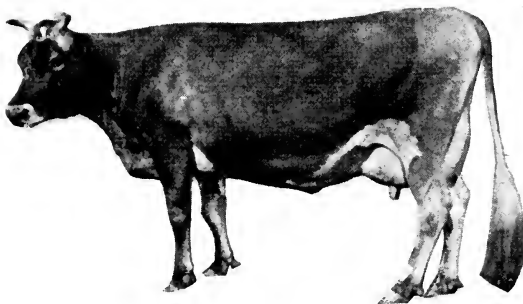
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1st	day,	2	pounds	warm	bran	mash.
2nd.	"	"	"	"	"	"
3rd.	"	"	"	Bran,	2	pounds milk ration.
4th.	"	4	"	milk	ration.	
5th.	"	5	"	"	"	
6th.	"	6	"	"	"	
7th.	"	7	"	"	"	
8th.	"	8	"	"	"	
9th.	"	9	"	"	"	
9th. to 15th. day, 9 pounds milk ration.						

After the 15th day increase the amount of grain by one or one half pound at a time, and continue increasing as long as the increase in milk amounts to more than the cost of the additional grain fed, or until the safety point in the amount of feed consumed has been reached. For instance, supposing one pound of grain costs $1\frac{1}{3}$ cents, and milk is valued at 5 cents a pound, and supposing that by increasing the grain $\frac{1}{2}$ pound, we obtain a gain of one pound in production; then we have gained 5 minus $1\frac{1}{3}$ cents or $3\frac{2}{3}$ cents by the increase. The results cannot be accurately determined by increasing the feed every day. There should be an interval of at least two days between successive increases. After the cow stops responding to an increase in feed, try lessening the amount, and note whether the cow will hold her level of production on the lessened amount of feed. The record of each individual cow is studied every morning, comparing the record of the day before with the previous days, to determine whether she will produce more milk or more economically, if the feed is increased or lessened.



FEED TRUCK



IMPORTED WHITIE

(Winner of Gold Medal for production 1919, 12519.0 lbs. of milk and 745.01 lbs. of butter fat)

To determine the condition of the cow.

If the cow is off condition or is getting ready for a break in production, usually the first sign will be in the milk weights. In studying the chart daily this condition can be readily detected. If the cows show signs of going off, or dropping in production, reduce the feed accordingly, and return gradually to the normal amount.

The following notes should be marked in the corresponding squares whenever necessary as a record of the cause of any irregularity.

- (b) did not clean up.
- (c) cleaned up with molasses.
- (d) in heat.
- (e) Indigestion or bloat.
- (f) Dysentery.

The chart as illustrated was started on the fifth day after freshening. The cow was fed 2 pounds of warm bran mash the day that the calf was dropped, the second day 3 pounds of bran mash, the third day 2 pounds of bran mash and two pounds of the regular milk ration. The fourth day 5 pounds of milk ration. The fifth day, which is the first day on the chart, 6 pounds of milk ration. From then on the increase was very gradual, the amounts being determined by the general condition of the cow, the way she relished her feed, and the quantity of milk flow.

We considered in this case that 55 pounds was her true level or safety point, and when she reached this mark we stopped increasing the feed. She was fed 17 pounds per day for 21 days and then raised to

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18 pounds per day. At the end of 10 days her feed was reduced to 17 pounds again, and it proved that she produced more milk on the lessened amount of grain. Her daily milk average for 148 days is 48.9 pounds. She has never been off feed. Her highest day's milk was 62.1 pounds, and only four times since she reached 45 pounds per day has she milked below this figure. The average monthly profit above cost of feed was \$24.82.

I do not mean to imply that cows can be fed entirely by rule or chart, but our results have demonstrated that certain rules, charts and schedules are essential to the production of maximum results in feeding and caring for herds when used faithfully as a guide.

Do not add to the ration anything that is against the test rules of the cattle association. The less medicine and stimulant the cow receives the better will be the results in the long run. Certain conditions that are not always under control will cause variations in the percentage of fat, such as changes in weather, or in milkers, the cow being in heat, or any other radical changes. All attempts to raise the fat percentage by other than natural methods, have been found in many experiments to be very costly.

The farmer who has the requisite land and other conditions to raise most of his own feed is indeed fortunate. It is possible in some sections to raise practically all of the feed and still have a balanced ration.

CHAPTER IV

FEED AND CARE OF BULLS

THE YOUNG bulls up to 18 months old are fed the same ration that the heifers receive, except that after the sixth month they are given a little more grain. After the sixth month they are not allowed to run with the heifers, but during the summer they are kept in the summer yarding system, and in the winter in box stalls. When the bull is about ten months of age a ring is placed in his nose, and he may now be used for light service, but the breeding schedules should be arranged so that the intervals will not be too frequent until after the eighteenth month.

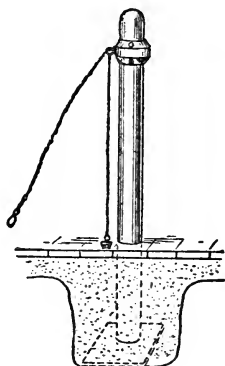
It will save much annoyance after the bull is mature, if he is led with a halter and rope for a short distance each day. An unruly, cross or vicious bull is usually the sign of bad bringing up, and reflects on the breeder.

The mature bull to be in the best breeding condition should be vigorous and quick, but not too fat. He is fed from two to six pounds of the regular milk ration, the amount depending upon the frequency of service and on his weight as compared to his normal weight when in ideal condition. He is also

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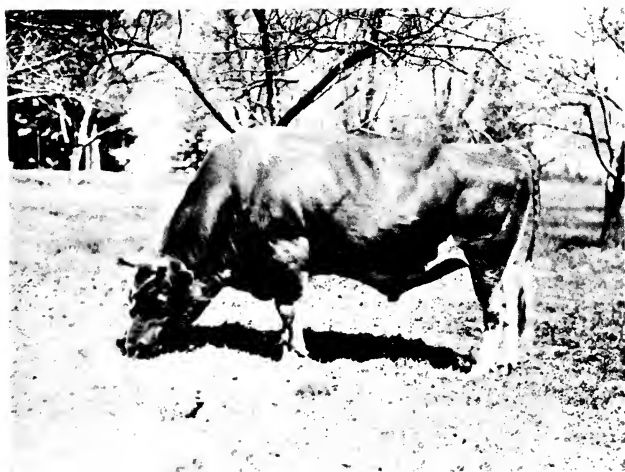
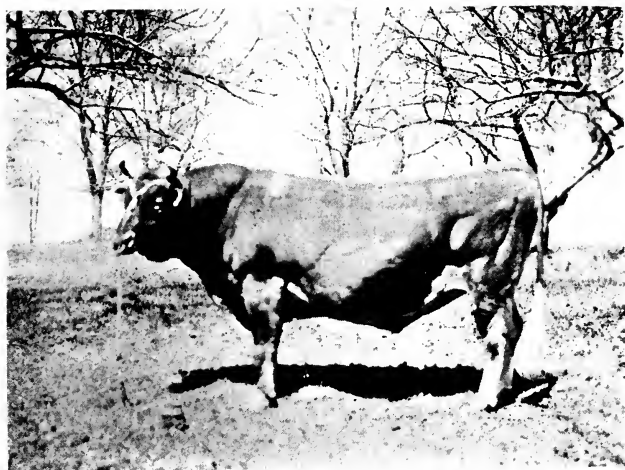
given a small amount of silage or soiling crops, and all of the alfalfa hay that he will eat with relish.

So many accidents have occurred with bulls that were loose in the pasture or box stall, that we believe in keeping him absolutely under control by not giving him his own freedom. The box stall or pens for bulls measure 14 by 14 feet. In the center of each pen is a bull post. It is an iron post



Post for Tying Bull in Center of Box Stall

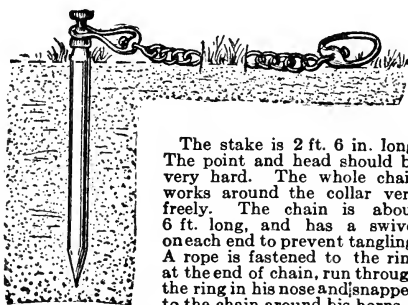
imbedded at least two feet in concrete. The collar near the top works on ball bearings and revolves very freely. The tie chain is run through the ring in this collar and is either attached to a heavy halter on the bull, or else is fastened to the chain around his horns. On the other end is a lead weight just heavy enough to draw up the slack in the chain. The length of the chain is adjusted so that the bull cannot quite reach the outer partitions of his stall. By continually walking around this post he gets as much exercise as though he were loose. He is fed



BULL TETHERED IN PASTURE

in a manger built in one corner of the pen, and when he is moved the attendant does not take the chance of catching a loose bull, but coaxes him to the full length of the chain, and then fastens the staff to the ring in his nose.

For fresh air and more exercise he is taken out daily and fastened to a tether in a good grassy plot. He walks around within the circle of the chain's length, and when the grass is eaten



The stake is 2 ft. 6 in. long. The point and head should be very hard. The whole chain works around the collar very freely. The chain is about 6 ft. long, and has a swivel on each end to prevent tangling. A rope is fastened to the ring at the end of chain, run through the ring in his nose and snapped to the chain around his horns.

Tether Chain

off, the tether is removed to another spot. In winter when the weather is such that he cannot be tethered, he is taken for a walk of at least one mile. He should be exercised by one of these methods every day. If a bull has not the vigor or quickness or sureness that he should have, it is probably because his ration is too wide, or he does not get sufficient exercise. Bulls are just as apt to have periods of sterility as cows are to have spells of barrenness.

We are satisfied that this system gives our bulls

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plenty of exercise, and feel that it is better to be safe than sorry.

The bulls at Brookwood Farms have always been fed the regular milk ration that is fed to the test cows, in amounts varying from two to six pounds a day, or just enough to keep them in good breeding condition and not fat. They also receive a few pounds of silage or soiling crops daily, and all of the alfalfa hay that they will clean up with relish.

Many farmers make it a custom to dispose of their herd bull when he is about three years old, but this is a great mistake, especially if he is producing good daughters. He should be kept in the herd as long as he maintains his breeding powers, and a second bull used to breed to his daughters.



GOLDEN FERN'S NOBLE
(Taking his morning setting-up exercises)



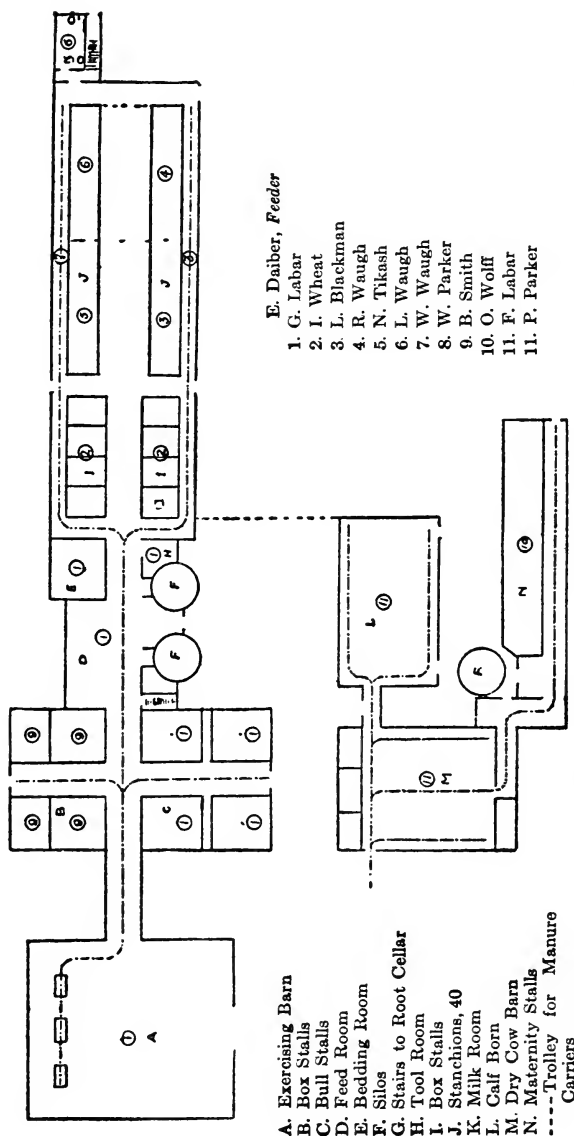
BULL LED BY STAFF

CHAPTER V

MANAGEMENT

REGULARITY in all work is a necessity in the cow barn, and to be regular and efficient it is necessary to have a time table or schedule for all operations. At the end of this chapter are shown our rules and schedules for the cow barns, which are hung on a bulletin board with a glass cover, located in a conspicuous place in the feed room as a reminder to the employes of the essentials that must be taken care of daily. Certain work will turn up that cannot be arranged by schedule, and this work is taken care of by instructions from the herdsman.

On page 58 is an outline floor plan of the cow barns. Every section is numbered, and each man has a number that corresponds to his own section. He is held responsible for the cleanliness of his section, for leading the cows in and out to pasture, for the general conditions and the milking of the cows in his own section, and if anything goes wrong, or the cleanliness or condition of certain cows is not right, we know by referring to the chart who is responsible for the condition. On the other hand the men know exactly the work they have to perform each day, as though their section was a separate barn. It is a very good plan to have an understudy for every job



Outline or Floor Plans of the Cow Barns, Showing by Numbers what Sections Each Man is Responsible for, as well as what those Sections Include, as per the Letters before the Explanations on the Left

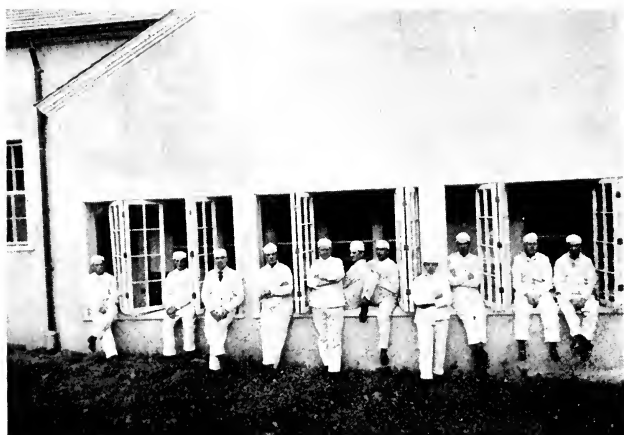
(Copyright, 1918, M. H. Roberts, Jr.)

of importance, so that if the regular man is sick or off duty we can order the substitute to do his work according to the number given to him, without going into details of explaining or breaking him in on the new work. In the absence of the feeder the substitute feeder would of course carry on the feeding according to the feeding chart.

Daily work schedule. There is at least one man on duty in the cow barns at all times. The night man No. 7, and day man No. 8, work 12 hours each, relieving each other at 6:30 A. M. and 6:30 P. M. Before No. 7 is relieved in the morning he has the barns, cows, gutters, etc. clean. When No. 8 comes on at 6:30 A. M., his first work is to wash and dry the hind parts and udders of every milking cow, using a separate cloth for each one. This limits the chance of the spreading of cow-pox or other infections that may be spread if the same cloth were used for all the cows, and is more sanitary. During this time the feeder is preparing the feed, so that when the milkers come in at 7 A. M., everything is in readiness for them to start milking. During the milking period the barns are closed to visitors and outside employees of the farm, and all work in that section of the barn is stopped. The milk pails used are of the small-mouth design. The milk from each individual cow is taken to the milk receiving room, where it is weighed, recorded and poured into a drum, connected by a pipe passing through the wall to the receiving vat in the milk room. On arriving here it is taken care of immediately. The milk room is part of the dairy, and the

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floor level is eight feet lower than that of the milk receiving room, so that all milk is carried to the dairy by gravity. In one corner of the milk receiving room is a wash bowl with hot and cold running water. Before milking each cow, the milkers wash their hands and scald the milk bucket. During milking, they wear white suits that are laundered and sterilized daily. After the milking is completed the milkers change their white suits for khaki. The cows are first given a thorough grooming, then their hind quarters are washed with a good disinfectant. This is done as soon as possible after milking, and by the next milking all odor of the disinfectant will have disappeared so that there is no danger of tainting the milk. By this time the cows have cleaned up all their feed and are turned out in the exercising yards. Each man then cleans his own section. The cement and cork-brick floors, gutters, mangers and all piping for stanchions are thoroughly scrubbed, the stalls and gutters disinfected, and clean bedding placed ready for the cows to be brought in again. From this time until two o'clock the work is arranged for by the herdsman. The cows are turned out every day in the year. We have only one rule when *not* to turn them out, namely, when the ground is icy and slippery. In this case they are exercised in the covered exercising yard, and watched closely. We find that if they are turned out every day, and get accustomed to the gradual seasonal changes, they will be more hardy and have less chance of taking cold than if kept in the barn. They are turned out in rainy and snowy weather,



MILKERS

care being taken not to keep them out long enough to get over-chilled. The barns in winter are kept at a temperature of about 50 degrees, always well ventilated and with a good circulation.

At two o'clock we start to bring the cows back into the barn. They are then brushed off and the udders washed, ready for the second milking at three o'clock. From then on the schedule is carried on according to the chart.

Thoroughness and efficiency of the milkers. — It is one thing to know a cow, her likes and dislikes, and another thing to have the disposition and patience to treat her in a proper manner. We have noticed in changing milkers on certain cows that one milker will get 1 or 2 lbs. of milk more than another. The secretion of milk is involuntary, but under unnatural conditions the cow will hold back her milk to a certain extent, and most of these conditions can be controlled by the milker. He should understand the structure of the udder and the secretion of milk in order to get the maximum amounts. The methods of milking greatly influence the yield, but the treatment of the cow is also very important. It is necessary to have absolute quiet in the milking barn. Frequently the presence of an official tester talking to the milker, rough and abusive treatment or talk, or any other irregularities that tend to cause the least bit of excitement or nervousness in the cow, will cause her to hold back the milk. In recording the reasons why a cow may be down in milk at a certain milking it would very often be safe to say that the milker "had a grouch on."

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We always insist that the milkers use the Hegelund method of milking, and get excellent results from it. The following is a description of this method, taken from "Investigations of Methods of Milking," Woll. Wis. Exp. Station, Bulletin No. 96.

First Manipulation.—The right quarters of the udder are pressed against each other (if udder is very large only one quarter at a time is taken), with the left hand on the hind quarter, and the right hand in front on the fore quarter, the thumbs being placed on the outside of the udder, and the forefingers in the division between the two halves of the udder. The hands are now pressed toward each other and at the same time lifted toward the body of the cow. This pressing and lifting is repeated three times, the milk collected in the milk cistern is then milked out, and the manipulation repeated until no more milk is obtained in this way, when the left quarters are treated in the same manner.

Second Manipulation.—The glands are pressed together from the side, the fore quarters are milked each by itself by placing one hand, with the fingers spread, on the outside of the quarter and the other hand in the division between the right and left forequarters; the hands are pressed against each other and the teat then milked. When no more milk is obtained by this manipulation, the hind quarters are milked by placing a hand on the outside of each quarter, likewise with fingers spread and turned upward, but with the thumb just in front of the hind quarter. The hands are lifted, and grasp into the gland from behind and from the side, after which

they are lowered to draw the milk. The manipulation is repeated until no more milk is obtained.

Third Manipulation. — The fore teats are grasped with partly closed hands and lifted with a push toward the body of the cow, both at the same time, by which method the glands are pressed between the hands and the body; the milk is drawn after each three pushes. When the fore teats are emptied, the hind teats are milked in the same manner.

Methods of drying off the cow. — The first step in drying off the cow is to gradually reduce the grain ration, and after a few days take it entirely away, until after the cow is dry. At the same time we lessen the milkings from three times daily to twice. About the fourth day start milking only once and then do not strip all of the milk out of the udder. After another few days commence milking every other day, so that in ten days or two weeks she is absolutely dry. Some cows will not dry up so quickly, but if there is still some milk in the udder at this time it will usually absorb without any harmful results if left alone. This however must be left to the judgment of an experienced cow man.

Milk Fever. — We figure that each cow is going to have milk fever about the time of calving, and we are so prepared. If she does not have it we consider it fortunate. We have had cows taken with milk fever before calving, but our experience is that this is exceptional. In such cases with a little assistance at calving time, they usually recover with no ill effects. The time to apply the milk fever treatment is at the first symptoms, pump the air into

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the udder while the cow is still on her feet. If caught in time she will usually recover without getting down. It is important to release the tapes that have been tied to the teats to hold the air in within two hours, or sooner if signs of recovery are apparent, as they stop the circulation of blood. In cases where the cow does not show signs of recovery within two hours, or has a relapse after the first recovery, it will be necessary to inject air the second time. Too much care cannot be taken in sterilizing and inserting the tube in the teat, as a serious infection or injury may result from careless treatment at this time. After recovery the air is not usually milked out for several hours. Good milk fever outfits, containing detailed instructions for their use, can be secured from any reliable veterinary supply house.

We have had only one case where it was necessary to milk the cow before calving. This, however, should not be done unless absolutely necessary.

Management of Dry Cows. — As soon as the cow is dry she is placed in the special dry cow barn, and fed according to the methods as outlined for dry cows in Chapter III. The dry cow barn is not connected directly with any of the other buildings, and is quiet, sunny, and well ventilated. The cow is weighed frequently, and fed so that she will be somewhat over her normal weight at calving time. Plenty of exercise is essential to keep the digestive system in the best condition, and to strengthen the body in general, so that the cow will have enough stored up vitality to carry her safely through the trying period

of calving, and the drain of a year's milking. She should be exercised several hours daily, and may be left out in pasture both day and night until within two or three weeks of calving time.

Exercise for Milk Cows. — There seems to be some difference of opinion as to the exercise of test cows. Some herdsmen prefer to keep the cows in a box stall without turning them out during the entire test. Their reason for this is that the cow wastes too much energy in grazing over the fields. We have found that a test cow who is being fed to the limit of her safety point must have a certain amount of exercise to keep her in condition to properly handle this feed. The results of the following experience will demonstrate the importance of exercise for test cows. Up to the time of this experience my opinion had been that the animals would produce more milk if confined to a box stall and given very little exercise. This was based upon the opinion of some other herdsmen, and on a theory which I later discovered was all wrong. During this particular winter the cows had not been exercised for several weeks, not since the very cold and severe weather had set in. We first had two cases of bloat, and a few days later a few cases of impaction, then following this was more bloat and other digestive troubles. We of course cut down on the feed but this did not seem to relieve the condition very much. Samples of the grain, silage and hay were sent to the State experiment station, but they reported nothing wrong in any way. Outside veterinarians were brought in, but could find nothing wrong, except to

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suggest that they were being fed too heavily. We then decided that the trouble might have been caused by lack of exercise, and started turning the cows out for a while each day. This relieved the digestive troubles, and from then on we went back to exactly the same feed and amounts that we had been feeding. The cows had been used to the warm stables, so that after we started turning them out, a large share of them had colds, laryngitis, etc.

During the following fall the cows were turned out for three or four hours every day and this was continued all through the winter. The cows became accustomed to the gradual changes in the weather so that it did not affect them as the sudden change had done before. It was particularly noticeable this past winter that the cows were turned out every single day, in rain, snow, and when the temperature was almost down to zero, and yet not one had a sign of a cold, and the production records demonstrate the absence of digestive troubles. I feel that I can safely say that exercise is essential to the production of all but seven-day records, and that a certain amount of exercise does not waste energy, but exercise and fresh air are two of the factors necessary to good production. We do believe, however, that a small exercise lot used in connection with the soiling system is more economical, and better than a large grassy pasture without the soiling system.

Number of Milkings Per Day.—This depends largely upon the conditions, or whether the milkers have outside work to do in connection with the barn



WINTER PASTURE SCENE

work. We have found that there is quite a difference between milking twice and three times, and that the cows will give more milk, and a slightly higher fat percentage with the latter, but the additional results gained by milking four times per day are very slight unless the cow happens to be milking very heavily. The final results will be much greater if the intervals between milkings are the same.

Bonus for Milkers. — The importance of having good steady milkers cannot be overestimated. We require that they live up to our rules, and in return we make the conditions as comfortable and interesting as possible. When milking three times a day at eight-hour intervals it is necessary that the milkers live near their work. We have a dormitory over part of the dairy buildings that the men call the "Hotel Udder." Here they are very comfortable and are furnished with farm papers and a farm library. They are also furnished with baseball and basketball outfits, the games being played after working hours. As an added inducement to have them keep up their interest, we give them bonuses as follows.

For each cow in the monthly 50-pound list	\$1.00
For each pound of butter fat between 50 and 60	
pounds { cows over 2 yrs. . . . .	.05
{ 2 year olds . . . . .	.06
For each pound of butter-fat over 60 pounds . . . . .	.10

This money is put into the pot, and divided equally among the milkers at the end of each month, or when the reports have been confirmed by the cattle club.

The following bonus is given yearly: The records

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are taken from the A. J. C. C.—R. of M. volume, the year beginning and ending with the records contained in this volume. A man to be entitled to share in this bonus must have remained in the employ of the farm during the entire year.

For the best class record. The best 2-3 or 4 year old daughter of any bull of the breed	\$10.00
For a cow that makes the record that proves her the best daughter of any bull.	50.00

Manure Disposal and Compost.—The manure trolleys and carriers run through the entire barns convenient to all box stalls and gutters. The trolleys lead to the exercising shed in the floor of which there are three trap doors. This shed is built on a slight grade, so that the basement is several feet high and the floor on a level with the outside grade. Three manure spreaders are backed in this basement, directly under the three trap doors, and when the manure carriers are dumped over the doors, the litter falls into the spreader. As each spreader is loaded it is taken directly to the fields and spread. If there are no open fields on which to spread the manure, a compost is made by first placing a layer of horse manure on the ground, making a strip slightly wider than the width of the wagon, then on top of this a layer of cow manure, and third a layer of peat or dirt. Each load drives over the compost and packs it. The layer of dirt and the continual packing with the team and wagon driving over the compost, excludes the air and causes the compost to rot rapidly without burning. Many farmers do not use baled shavings because it takes



EXERCISING SHED



MANURE SPREADER

several years for them to rot on the fields, but with this method they will rot in a few months. It also pays to sprinkle raw rock phosphate either in the gutters or on each load as it leaves the barn. In comparison with the other styles of compost that have to be turned, and must have the liquid pumped over them several times during the year, this method is much more convenient and labor saving.

Each gutter in the barn has two outlet traps. While the cows are in the barn the trap leading to the liquid manure pit is open. This pit is located outside of the barn and well covered. It is emptied by a pipe, the opening of which is some distance away and lower than the pit. It is arranged so that at this point the pipe runs vertically out of the ground, high enough for a sprinkling cart to be filled by gravity from the top. The liquid is then spread on the fields. While the barns are being washed, the other trap is open and the one leading to the tank is closed. This is done so that the wash water will not run in and dilute the liquid manure, but is carried away and run through a septic tank.

Purchase and Storage of Feed. — One of the largest items of expense on the dairy farm is the feed bill. There are many openings for the development of leaks from the time the feed is ordered until it is fed to the cows, and most of them can be controlled by the farmer. The cow cannot do all the economical producing if her manager does not help her, or is wasteful in the purchasing, handling or feeding of the different feeds. By this I do not mean to imply that he should economize by reducing the feed pur-

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chased, as liberal feeding is usually economical feeding. On the other hand over-feeding is wasteful feeding. To illustrate this to a certain feeder who had been feeding more than was necessary to a certain cow, I had him give her one pound of feed less, per day, for three days, and I made him dump the extra pound in the manure cart. At the end of that time he was to compare the milk weights of these three days with the three days previous. The results proved to him that there are cases where it is more profitable to spread the feed on the fields, than to feed it to a cow and get no returns for it.

In purchasing feed, the quality as well as the price should be considered. Most experiment stations will gladly analyze samples of feed purchased, and it is good practice to avail ourselves of this opportunity and send them samples frequently. The availability should also be considered. Many dealers find it difficult to keep certain kinds of grain always in stock, and for this reason it is best to have a substantial supply always on hand. We figure the number of pounds of each kind of grain used per month, and when the supply gets so that we have only enough left to last six weeks we secure quotations from at least three dealers, and order, in mixed car lots, enough of each kind of grain so that it will as nearly as possible all run out together, and clean up on the old lot before the new is touched. In this way certain grains that may deteriorate are kept always fresh and in good sweet condition.

The feed storage room is lined with a rat proof wiring. All feed is hoisted to this room with an

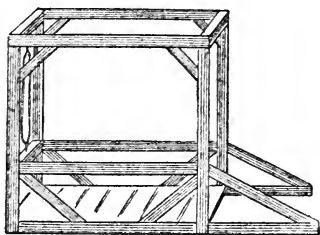
automatic hoist run by a gas engine, no hand or horse hoisting being necessary, and is distributed so that each kind of grain is piled separately. The floors are swept clean and after one lot of grain has been used, any that has spilled or leaked from the bags is gathered up and mixed with the ration, there being absolutely no waste. In this room is a feed mixing platform 12 feet by 15. The feed is thoroughly mixed and then shovelled direct into one of the three bins. One bin is for milk ration, one for dry cow ration and one for beet pulp. Each bin is lined with galvanized iron, and connects with the feed room directly below by round iron pipes or chutes, so that the feed can be drawn into the carts as required.

Coöperative buying of feed, either through a co-operative society, or by several neighboring farmers purchasing feed together in car lots, has proved to be most successful and economical in many communities.

Bale Wire. — Most cattlemen have had experience with nails and wire in cows' stomachs. Many a good cow has been lost by a piece of bale wire getting lodged in her stomach, and in many instances this was probably due to carelessness. We should do all that we can to prevent this occurrence and insist that every bale wire is accounted for by enforcing rule 14: "All wires should be cut on the opposite side of the tie, so that there will be no short pieces of wire that a cow could swallow. The wire is placed in a can outside of the barn, which is removed daily."

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Trimming the feet. — This drawing is a diagram of the rack that we use when trimming the cows' and bulls' feet. They are led into the rack and fastened in the stanchion built in the front. The hind feet



Rack for Use in Trimming the Feet

are either drawn up between the legs as in shoeing horses, or placed on the slanting 3 by 3 inch strips in the back. The front feet are drawn up on the brace either on the front or side. The tools necessary are a blacksmith's rasp, knife and nippers. The first operation is to clip off with the nippers the outer edge or horn, that has grown long. Then flatten the bottom or sole of the foot by paring off with a knife and finish up with the rasp. Great care should be taken until you have had experience enough to know just how far to go without cutting into the quick.

Breeding Rack. — The breeding rack is used especially for light cows or heifers, that otherwise could not stand the weight of the bull. The cows are led into the rack and fastened to the stanchion, which is adjustable, and can be moved either forward or back, according to the size of the



BREEDING RACK

animal. The dirt under the hind feet is loose so that the legs can be lowered, if necessary, by shoveling some of the dirt away. It is difficult sometimes to get a mature bull to use the rack, but any bull can be taught to use it, if we are persistent in our efforts.

Protection against Flies.—The best method of combating the fly is to destroy the breeding places, by not having any manure near the barns and to practice every sanitary precaution possible. Of course it is essential that the dairy should be screened, and it is also very good to have the milking barn screened. The employees should be very careful in going in and out of the doors, not to keep them open longer than is absolutely necessary. Fly traps should also be used, baited with molasses. The flies that happen to be in the barns will collect on the windows at certain times during the day, and at this time each man should use a fly swatter to destroy them. To reduce the flies to the minimum requires the coöperation and care of the employees. The extra cost and trouble will be repaid in a short while by the additional flow of milk secured by the increased comfort of the cows. During the hottest part of the day the shutters should be kept closed so that the barn will be cool, and the cows should be turned out for exercise in the evening when it is cooler and there are less flies to bother them.

Soiling System.—The soiling system as adapted to dairy farms means that the cows are housed in barns and allowed to exercise daily in a practically grassless plot, and are furnished forage that is cut

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green, and delivered to the cows in a fresh condition. The results of the following experiments should be sufficient evidence as to the value of the soiling system for feeding dairy cows.

Otis, in the Kansas Station Press Bulletin 71, states that it required .71 acre of soiling crops to furnish a cow roughage for 144 days, and that it required 3.6 acres of pasture to furnish the cow with roughage for an equal period. Voorhees, in Forage Crops, states that it cost \$6.50, on an average, for each ton of dry matter yielded in the various soiling crops, and that the yield of dry matter per acre ranged from 3 to 4½ tons. He also found that the feeding value of this dry matter was nearly as great as that found in fine feeds that cost over \$20.00 per ton.

The advantage of the soiling system then is that it saves on the feed bill. We estimate that one acre will furnish two and one half cows with soiling crops for one entire season. According to various authorities it would require from three to four acres of pasture to supply one cow with sufficient grass for one season. The land saved by using the soiling system is planted to crops that produce considerably more profit than we would net from pasturing. This system requires no fences, and so not only does away with the cost of erecting and maintaining the fence but at the same time makes available for use the land otherwise taken up by the hedge-row. It absolutely controls the food consumed by the cow so that we can accurately balance her ration and feed in amounts according to her requirements. It

The same land should not be reserved for soiling crops each year, but they should be worked in on the rotation of all of the fields. The crops should be planned a year ahead so that we can arrange to plant either rye or clover or wheat in the fall for use early the next spring. We use the crop schedule chart as a help in working out the crop ro-

[illegible]

tations. There is a separate chart for each field, and a summary chart covering the entire farm. The acreage of each crop is determined by the requirements of the stock, and distributed among the va-

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rious fields in order to work out the best rotation for improving the fertility of the farm.

As an example of a system of soiling crop rotations, the following is the record of the results of one year's planting which supplied fifty animals for six months at the New Jersey Experiment Station.

Kind of Crops	Seed used, bushels	Date of seeding	Period of cutting and feeding	Yield, tons
Rye, 2 acres.....	4	Sept. 27	May 1-7	9.4
Rye, 2 acres.....	4	Oct. 3	May 7-19	19.2
Alfalfa, 1 acre, first cutting.....	7 $\frac{1}{2}$	May 14	May 19-25	11.1
Wheat, 2 acres.....	4	Sept. 26	May 25-June 1	10.4
Crimson Clover, 6 acres.....	1 $\frac{1}{2}$	July 16	June 1-21	42.8
Mixed Grasses, 1 acre.....	...	.....	June 21-26	8.3
Oats and Peas, 2 acres.....	3	April 2	June 26-July 4	12.4
Oats and Peas, 2 acres.....	{ 4 } { 3 }	April 11	July 4-9	8.2
Alfalfa, second cutting.....	.....	.....	July 9-11	2.1
Oats and Peas, 5 acres.....	{ 10 } { 7 $\frac{1}{2}$ }	April 19	July 11-22	16.4
Southern White Corn, 2 acres.....	$\frac{1}{2}$	May 2	July 22-Aug. 3	17.7
Barnyard Millet, 2 acres.....	1 $\frac{1}{2}$	June 19	Aug. 3-19	23.2
Soy Beans, 1 acre.....	2	June 1	Aug. 19-25	8.8
Cow Peas, 1 acre.....	2	June 10	Aug. 25-Sept. 1	10.5
Cowpeas and Kafir Corn, 2 acres.....	{ 2 } { 1 }	July 10	Sept. 1-16	24.4
Pearl Millet, 2 acres.....	$\frac{1}{2}$	July 11	Sept. 16-Oct. 1	20.2
Cowpeas, 1 acre.....	1 $\frac{1}{2}$	July 24	Oct. 1-5	8.0
Mixed Grasses, 5 acres, partly dried.....	.....	.....	Oct. 5-27	20.0
Barley, 2 acres.....	3 $\frac{1}{2}$	Sept. 2	Oct. 27-Nov. 1	5.2

On a number of these plots, 2 crops can be grown in one season, and on others the second cutting is used.

Summer silage is used and recommended by many farmers, who claim that it is a great labor saver, since the crop is hauled to the silo all at once and the daily carting of one or more loads to the barn, as necessary with the soiling system, is obviated. On the other hand many farmers who have tried this complain of the poor keeping qualities of other than Corn silage; but the fault may be theirs in not cutting it at the proper time, or in faulty filling, not packing it tight enough, etc.

Blue Belle's Blue Fox 69632.....
Sire of Anna's Dorothy, 14
lb. 15 oz. in 7 days. Sire of
Blue Fox's Eminent, the sire
of Blue Fox Eminent's Chromo.
10396 lb. milk, 635 lb. 12 oz.
butter as a yearling.
Lady Viola 238438.
First over Jersey, 1904. First
over Jersey and champion, 1905.
Certificate of Merit in public
butter test, May, 1904, 2 lb., 12 oz.
in one day, 50 days in milk.
Dam of —

Willoh's Rosy..... lb. oz.
Miss Viola..... 3
Poppy Viola..... 2 15
..... 2 9

Imp. Golden Fern's Lad 65300.
Champion winner, N. Club
Show, Jersey, 1896 and 1897.
Sire of 39 — lb. oz.
Golden Fern's Tulip..... 597
Golden Sultana..... 595
Aldan F. 6213, C.
Champion Flying Fox 61441.
Sire of 39 — lb. oz.
F. F.'s Oxford Queen..... 870 8
F.'s G. Princess..... 798 8
Fox's Pride o' D..... 787 9
Oxford Lass P. 3582, C.
Sire of — lb. oz.
Oxford Ixia..... 2 13
G. Queen of St. Sav..... 2 44

Noble of Oaklands 95700.....
1st prize, 7 entries, with
progeny, Royal Show, April,
1911.
He and his progeny have
won more than 200 1st prizes
and Championships at impor-
tant shows, including Grand
Championship at National
Dairy Shows of 1912, 1913 and
1916.

Sire of 56 — lb. oz.
Manor's N. Queen..... 702 11 1/2
N's H. Queen..... 614 3
N's Golden C..... 530 15
N's Beauty G..... 520 8
Imp. W's Fairy..... 518 1
Imp. N's Hip..... 516 3
Noble's Ida..... 509 4
N's Fancy P..... 503 13
Lady West of O..... 495 6
Lady Aldan P. 8470 H. C......
Winner of first prize over Jersey.
August, 1919. Blythwood Bowl,
August, 1909, and numerous other
prizes.

Oxford Lad, 71238.....
Sire of 46 — lb. oz.
Oxford Coottie..... 724 15
Oxford Lad's Aster..... 694 6
Gland Rosabel 3d..... 659 8
Oxford Grey Princess..... 654 12
O. Lad's B. Beauty..... 627 8
O. Lad's Merline..... 577 5
Oxford Ever, P. 9340 H. C......
Dam of 2 — lb. oz.
Agatha's Oxford Lass..... 2 1 1/2
Oxford Triumph..... 1 14
Dam of Oxford Knight, sire of
12 tested cows.

Golden Fern's Noble P. 4570,
H. C.....
First over Jersey, April, 1912.
First over Jersey and second
champion R. J. A. S., August,
1912.

First and sweepstakes (two
year olds) St. Saviour, 1911.
Champion, St. Saviour, 1911.
At the April, 1915, show he
won first over the Island. Also
first with progeny and Peer's
Perpetual Cup.
Grand champion National
Dairy Show, 1916.

Sire of lb. oz.
G. F.'s. Shy Lady..... 639 9
G. F.'s. Bene (308 d)..... 567 14
Minnie Fern (396 d)..... 520 13
Dorothy's A. F. (361d)..... 470 5
B. Lady Aldan..... 451 12
Gol. St. L. (289d)..... 439 2
Golden Fern's Str..... 433 6
Lady N. F. (293d)..... 431 8
Stale Bread 23d (321d)..... 410 6
G. F.'s B. Gene (323d)..... 408 10

Oxford Triumph P. 12120 H. C....
Certificate of Merit, 1 lb. 14 oz.
107 days in milk.
Parish prize, May, 1907.
Sweepstakes, Grouville St. Sa-
viour Show, 1907.
1st. and Sweepstakes (aged
cows) St. Saviour Show, 1912.
Official Island record, begun at
8 years old (1913-1914) — 224 lb.
3 oz. butter in 309 days, 4961 lb.
12 oz. milk.

FERN'S OXFORD NOBLE, P.
5013 H. C......
3d prize over the Island
shown with his progeny, May,
1917.

Sire of Ora's Fern, winner
of Parish prize St. Saviour,
May, 1917. Sire of Wyman-
dott's Pet, 3d prize in class and
Parish prize St. Owen's, May,
1917.

Sire of Fern's Oxford Pallas
2d prize, Trinity show, May,
1917.
He is now at the head of
the splendid herd being col-
lected by Mr. Jonathan War-
ner, of Youngstown, Ohio.
His daughters are a splen-
did lot and several now on
test are making very good
records.

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DAILY WORK SCHEDULE

- 6:30 A.M. — Breakfast. No. 8 wash and dry udders and hind parts of all milking cows.
- 7-9 A.M. — Nos. 2, 3, 4, 9 milk ten cows each. Nos. 1, 5, 6, 8, 10 mix feed, clean barns (except where milking) tend to dry cows, clean windows, etc., as instructed.
- 9-12 A.M. — Each man clean cows and bulls in section corresponding to his number, turn cows out to pasture and tether bulls, then clean, scrub and disinfect his own section.
- 12 noon to 12:30 P.M. — Lunch.
- 12-3 P.M. — All milkers off. Other men prepare feed, hay, silage, etc.; keep barns clean, trim hoofs, clip udders, hind parts, heads, etc.
- 2:30 P.M. — No. 8 wash and dry udders and hind parts of all milking cows.
- 3-5 P.M. — Nos. 2, 3, 4, 9 milk
- 5-11 P.M. — All milkers off.
- 5:30 P.M. — Supper.
- 6:30 P.M. — No. 7 (night watchman) relieve No. 8, keep barn and cows clean, tend to fires, etc.
- 10:30 P.M. — No. 7 wash and dry udders and hind quarters of all milking cows.
- 11 P.M. to 1 A.M. — Nos. 2, 3, 4, 9 milk.
- 1 A.M. to 7 A.M. — Milkers off.
- 6:30 A.M. — No. 8 relieves No. 7 and starts schedule again. No. 10 tends to cows in maternity barn, cleans stalls, etc., and turns out to pasture. No. 11 follows calf schedule.

GENERAL

- (1) Give to cows about one day before freshening, 1 lb. epsom salts in 2 quarts of water.
- (2) Do not give cold water to cow for 24 hours after freshening. Give warm water. In addition to all the hay she will eat, give —
 - 1st day 2 lbs. warm bran mash;
 - 2d day 3 lbs. warm bran mash;
 - 3d day 2 lbs. bran, 2 lbs. milk ration;
 - 4th day 4 lbs. milk ration;
 - 5th day 5 lbs. milk ration;

6th day 6 lbs. milk ration;

7th day 7 lbs. milk ration;

8th day 8 lbs. milk ration;

9th day 9 lbs. milk ration;

9th to 15th day 9 lbs. milk ration per day;

15th day increase grain about one-half pound per day until the safety point has been reached. After a few days drop back a pound or so and see if she will hold her level. Increase silage gradually.

- (3) Do not strip all milk from udder until beginning of third day after freshening, but relieve the udder of some milk.
- (4) Milkers must wash hands before milking each cow. No one except regular cow barn employees admitted to any part of cow barns without permit and not under any conditons during milking period.
- (5) Udders to be washed and dried before milking.
- (6) Milkers must always use the Hegelund method of milking.
- (7) No other work except cleaning of gutters to be done in cow barn during milking periods, at which time it is necessary to have absolute quiet and no talking.
- (8) Hind quarters of cows and gutters to be disinfected every morning after breakfast.
- (9) Keep fresh water before cows in box-stalls at all times.
- (10) Cows and bulls to be exercised every day.
- (11) Bulls to be disinfected before and after each breeding.
- (12) Clean drinking cups twice per week.
- (13) Wash windows once per week.
- (14) No one is permitted to open wires on bales of hay, straw or shavings unless some one from office is present.
- (15) Report every detail of anything unusual, and do not make any change (unless in cases of emergency) without reporting it first.
- (16) Any one found violating any of the above rules will be immediately discharged.

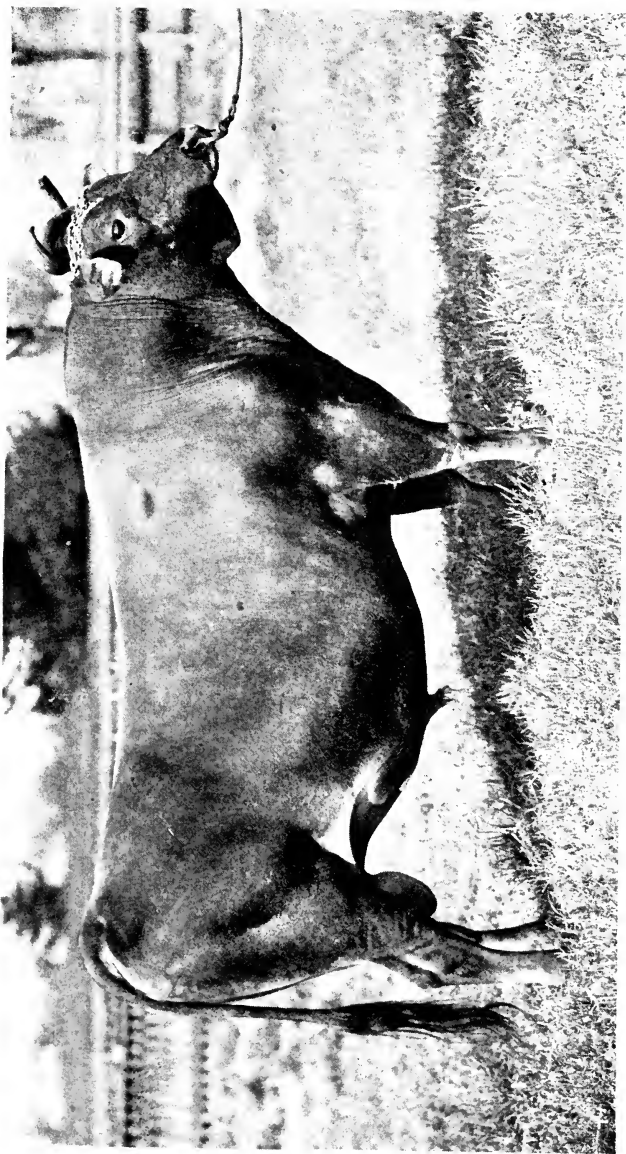
Cows due to calve within 2 months, are not to be turned out with the herd, but exercised in a separate lot.

CHAPTER VI

BREEDING AND SELECTION

IT IS just as important for the dairy farmer to be a thorough student of breeding, and to understand the principles and laws of breeding and selection, as it is for him to know how to feed his stock intelligently. Farmers who are starting a pure bred herd, and even those who have a herd established, will very often neglect their study and knowledge of breeding, probably because they do not realize its importance. We can increase the milk production of the present generation of our herd by better methods of feed and care, but the progressive farmer must plan for the future improvement of his herd and aim for each succeeding generation to be better and more economical producers than the last. In order to accomplish this he should know how and why before deciding definitely upon the future development. If he has a grade herd he should know how to develop the best pure bred herd with the least expense, or if he has a low producing registered herd he should know how best to improve that herd, not only by feeding, but by breeding.

The word breeding as we use it means the repro-



NOBLE OF OAKLANDS

duction and improvement of the dairy cow, and in each individual case the reproduction, development and improvement of our own herd. There are certain definite laws that apply to all animals, and while a large share of our breeding is from a practical standpoint, it is necessary, in order to get a clear understanding of the best methods of development, to understand these breeding laws and the results as given to us by the scientists. We must believe in what we do and as far as possible know why we do it. The beginner can become fairly proficient in many of these points by reading and study, but much remains to be learned by experience.

If we select, as brood stock, animals with special characteristics, we know that it is possible for these characteristics to be transmitted or inherited by their progeny, and even improved. If this could not be done the average cow would dry up in a few months, as the original wild cow did in the natural course of events after her calf was old enough to range for itself.

Law of Heredity. — The common saying "like produces like" may be taken as a rough approximation of the law of heredity. It is only roughly approximate, for it does not enable us to predict with any degree of certainty what the appearance or character of the offspring of given parents will be. Nevertheless it contains the truth. The expert who is familiar with the different families of stock can very often recognize the family relation of cows that he had never seen before, picking them out in a large herd by their outstanding characteristics

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transmitted from one generation to another in that family. Inheritance shows itself in the color of cows, in their digestive powers, strength, size, disposition and milk and butter-fat production.

The exact study of heredity is rendered difficult by the fact that a living organism is a very complex thing. Unless the attention is fixed on some one pronounced character, it is impossible, out of the seemingly confused collection of qualities, to distinguish any clear law or order in the relation between the qualities of parent and offspring.

Mendel's law. — The step that brought order out of confusion was taken by Gregor Mendel. He recognized that, in order to throw light on the problem of heredity, it would be necessary to select for experiment individuals having strongly marked and contrasted special characters. In 1865, after eight years' work in the seclusion of the cloister garden of Brünn, he published the results of experiments which form the foundation of our knowledge of heredity to-day. Mendel worked with plants, crossing various varieties of peas. But the laws which he discovered for these have been found to be equally applicable in the case of animals.

The nature of the law discovered by Mendel is most easily explained by an actual example. For certain reasons which will appear presently the relation takes on its simplest form in case not originally studied by Mendel.

If two blue Andalusian fowls are crossed the progeny is found to consist of three separate types in the following proportions:



IMPORTED LADY VIOLA
(Dam of Noble of Oaklands)



Black.....	25 per cent
White.....	25 " "
Blue.....	50 " "

If the offspring is bred, the following observations are made:

Black bred with black produces nothing but black.

White bred with white produces nothing but white.

Blue bred with blue produces black, white, and blue in the same proportion as before.

Black bred with white produces nothing but blue.

These results can be fixed in the mind by looking at them as follows:

Each fowl contains two elements (so called gametes), one derived from the male parent, the other from the female.

In the black fowl both elements are black. Hence when two blacks are bred they can produce nothing but black.

Similarly in the white fowl both elements are white.

But in the blue fowl there is a black and a white element. When they are bred the offspring may inherit in any one of the following ways:

1. Black from male and black from female = pure black.... 1
2. White " " " white " " = pure white.... 1
3. Black " " " white " " = blue } 2
4. White " " " black " " = blue }

so that the offspring will be pure black, pure white and blue in the proportion 1:1:2 or 25: 25: 50, as stated above.

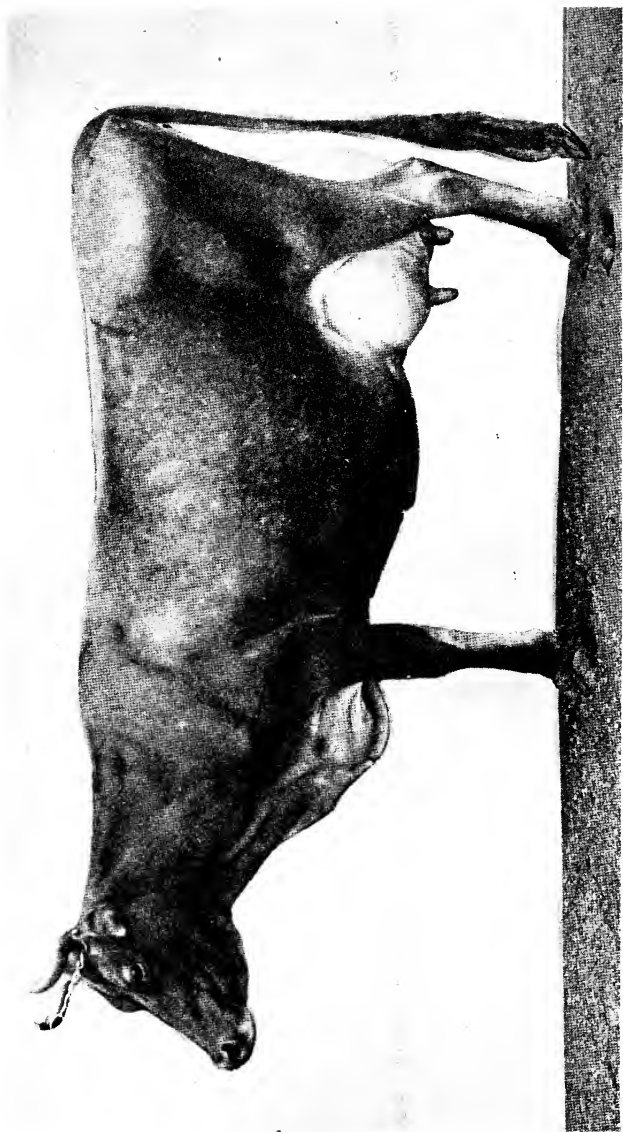
Dominance. — In most cases the situation is not

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quite so simple as in the case of the Andalusian fowl. The mixed offspring, instead of being directly distinguishable (as are the blue Andalusian fowl), is in outward appearance similar to one of the two pure types. The character which masks the mixed type is spoken of as the *dominant*, and the other character is spoken of as *recessive*.

For instance, Mendel by crossing tall peas with dwarf peas obtained nothing but tall plants. But if the seeds from the tall plants so obtained were grown, it was found that they gave 25 per-cent dwarf and 75 per-cent tall plants. It will be seen that this is really quite similar to the case of the Andalusian fowl, except that 75 per-cent of the tall plants include 25 per-cent of the pure tall and 50 per-cent of mixed plants resembling outwardly the tall plants. This conclusion is borne out by further breeding. The dwarf plants bred true to dwarf. Of the tall plants 25 per-cent bred true to tall and 50 per-cent give partly dwarf and partly tall progeny. Here tallness is the dominant, and dwarfness the recessive character.

In breeding cows we may not have knowledge of all the facts which would enable us to apply Mendel's law in detail and in its exact form. But it is useful to know that, for certain features at any rate, two parents, both possessing a certain character, will produce offspring all of which, without exception, possess that character. If stock of this kind has once been established, it will remain true unless contaminated by cross breeding with outside stock of different character. The significance of this



IMPORTED BLUE BELLE
(Granddam of Noble of Oaklands)

fact in connection with line-breeding needs no emphasis.

Variation. — While, as we all know, the offspring tends to resemble the parent, it is not identical with its parent in appearance or character, but varies more or less widely therefrom. Such variation of offspring from parent may in some instances work to the advantage of the breeder, but it may equally well work against him.

Reversion. — This term is used to denote the reappearance of a character that has been bred into the ancestry probably several generations back and is illustrated very clearly in the crossing of different breeds. If grade Jerseys have been bred for three generations, and the offspring appears to have Jersey characters, but in the fourth generation back a Holstein bull was used, the grade Jersey will be liable to revert back to the Holstein character and have a black and white calf, more resembling a Holstein than a Jersey. Reversion not only shows in the color but may show in any characters that are hereditary.

Type. — For each breed there is a certain fixed ideal type or standard of perfection to which the individual should conform as closely as possible. When we speak of this ideal type we think, in particular, of certain visible body characters relating to milk production. All heavy producers will more or less conform to that standard. A very good idea of what this standard is can be gained by studying the scale of points for show animals as outlined in this book in the chapters on the various breeds. We must look for refinement and symmetry. The ani-

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mal should have fine points, it should be lean and angular, yet vigorous vitality should show itself in a fine physique. Anything approaching coarseness must be avoided.

Systems of Breeding. Line-Breeding. This is the mating of animals whose ancestors trace back to the same individuals. In this system there is less chance of breeding an irregular variety of characters and more chance of fixing and improving the good characters already characteristic of that family.

In-Breeding is the mating of either sire and daughter, son and mother, or brother and sister.

Cross-Breeding is the mating of animals of different breeds, or different families, and is usually practiced in hope that the progeny will contain the good characters of both families.

Experienced breeders that have an outstanding animal will practice in-breeding for one generation, to fix that character in the offspring to be used for future breeding. Some exceptional animals have been developed by this method, but it is generally advised that the average breeder should not practice in-breeding, as it is just as apt to intensify the hidden recessive qualities as the dominant characters recognized and sought for.

The development of some great families has proved that by line breeding the outstanding characters have been transmitted and intensified with reasonable certainty and without creating a mixture or variety. What more can a breeder want after he selects his ideal family than by line breeding to transmit and intensify the good qualities already



CHAMPION FLYING FOX
(Great-grand sire of Noble of Oaklands)

existing? In so doing he begins the improvement where the other fellow left off.

Some breeders make a practice of line breeding, but now and then out-cross to another family. They may be justified in doing this under certain conditions. If they are not content to carry on line breeding and want to invent or acquire something new, and have the time, money and patience to carry it out, or if their herd is seriously lacking in a certain character, they may win by out-crossing if the new stock introduced has the desired qualifications and careful selection is made from the variety thus created. Many good cows have been developed by this practice, but the best results can be obtained only in the hands of the expert. The crossing of different families containing different characters corresponds to Mendel's results in crossing different characters, and we get similar results in comparison; a certain per-cent of the offspring will represent the character of one parent, another will represent the character of the other parent, and a certain proportion will represent a mixture of the characters of both parents. In other words outcrossing tends to produce variations and to a certain extent dilutes the characters already established. It may result successfully if the breeder eliminates the less desirable elements, eventually intensifying what he has gained by the cross.

A farmer who intends to develop a herd by the purchase of mature animals would probably have a great difficulty in buying the kind of animals that he wants, all from one family. He has to start

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somewhere, so he selects as many as possible from the family line that he intends to follow and the balance from another family that nicks well with his.

Line breeding is then practiced by using the original herd sire, and either a son or grandson on his daughters. Each bull is then bred to his own granddaughters.

Origin and History of the Breed. — Breeders should become familiar with the origin, history and development of the breed in which they are interested. This is not only an aid in breeding operations, but also enables them to talk more intelligently to prospective buyers.

Improvement by selection. — It is true that only one third of the dairy cows in the United States pay a very good annual profit for their owners. The second one third are such poor producers as to cause a loss of \$50,000,000 annually, and the remaining one third produce sufficiently to about offset this loss. It is also true that while these figures apply to the whole country, the same percentages apply to many individual herds. We all know this, but possibly do not realize that it may be so with our own herd.

We all suffer: the farmer through diminished profits, the consuming public through increased prices. Besides, there is a double loss. The cows that are boarded and stabled without compensation return evil for good, and avenge themselves by contaminating the breed with their equally unproductive offspring. Our aim is to breed to improve,



FERN'S OXFORD NOBLE

(Grandson of Noble of Oaklands, through Golden Fern's Noble)



and if we have taken time and study to select a good herd sire, we should also take time and study to select good cows to be bred to him.

What are we going to do about it?

One thing is clear. If we are to improve matters by selection, the first thing to do is to find out which are the losing cows. This seems so obvious that we wonder that it needs to be pointed out at all. Facts, however, show that the need is not only present, but urgent.

The second thing that we must do, having determined which are the losing cows, is to replace them — sell them for what we can get. Even giving them away would be cheaper than to keep on feeding and stabling them at a loss.

The third thing that we must seek to accomplish is to improve our stock, so that in the future there shall be less to discard, and that the cows retained for dairying purposes shall give a higher yield of profit. To some extent this third object will be secured automatically in discarding the unproductive cows, since good and bad qualities in this as in other matters are markedly hereditary. But much more than this remains to be done.

Having now clearly discerned our aim, our next concern must be to find or devise the proper means of attaining it.

First then, in regard to those losing cows. Their presence in the herd is a reflection upon our business methods. We ought to be ashamed of them. All that is needed is a systematic keeping of records. We must know for each cow the daily ration fed

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and the milk produced each day, by using the methods as described in Chapter III. The little extra time and trouble spent in measuring the feed and the milk output, and in making out the daily records is paid for many times over in the results.

Having weeded out the unproductive cows and sold them for beef, say, it remains for the farmer to attend to the third item on the program, the improvement of his stock.

The first step in this direction has already been taken, since productiveness is hereditary, and in weeding out the inferior cows from the herd, a higher average of milk production is assured for the next generation. By the use of good judgment and the intelligent application of the principles of stock breeding, something can be done on the foundation of a herd of grade cows alone. But so much more rapid progress is made by the infusion of pure blood, that any additional expense incurred to secure this will be very quickly repaid. Best of all, of course, is to replace the herd entirely by pure breds. This is not beyond the reach of the farmer of moderate means if he goes about it systematically and has patience to build up the herd gradually, as described in Chapter I.

After deciding upon the method of establishing our herd, we decide upon the kind of breeding to carry on, and the family or families to use. This is where the knowledge of breeding is especially helpful.

Selection of Family.—We should learn to base our selection upon absolute facts. A thorough study



MAGIC BELLE
(Granddaughter of Noble of Oaklands)

should be made of the pedigrees and the actual performance of each member of the families being considered. Do not be misled by a lot of red ink that does not mean anything, or by sensational advertising, but look for the outstanding characteristics and the actual performance, and the ability of the

Brookwood Farms Herd

BREEDING RECORD

Service # 1 Sept 1, 1919.

Bred Imported White H. No.

to Golden Fern's Noble H. No.

Morris H. Roberts
Herdsmen

This record to be filed at Farm Office immediately after service. Herdsman will note above if it is first, second or third service.

animals to transmit those characters. The longer a certain character has existed in a family the more certainly is it transmitted, the development being handed down through several generations and improving with each individual.

The future generation cannot inherit something that the parents and ancestors do not possess. Therefore if we are trying to improve by selection and breeding we must select from a pedigree of known producers.

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If the dam or granddam of the animal we select for breeding is foundation stock with unknown pedigree, we, of course, do not know the records back of that cow. Her ancestors may have been high producers, but the fact that we are most interested in is, does she contain good qualities, and is she transmitting good qualities to her sons and daughters and grandsons and granddaughters? If she is, we can rest assured that these characters have been inherited. On the other hand if the progeny of the foundation animal are not good producers, or are not old enough to have shown their productive ability, we are gambling with chances of winning on unknown quantities.

SERVICE ORDER

New York, April 3, 1918

Mr. Morris H. Roberts, Jr.,

You are hereby ordered to

breed Imported Whitle *H. No.* B. 924

to Golden Fern's Noble *H. No.* B. 648

after August 16, 1918 *and prior to* September 30, 1918

Recorded in Office Breeding Book	CHECK
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Selection should not be concluded with the investigation of the performance of the animal and its ancestors, but the type, conformation, and condition should also be looked into, and judged ac-



BEAULIEU MAID
(Granddaughter of Noble of Oaklands)

cording to the score card and the best ability of the buyer. Many cattle are purchased through correspondence, and in that case the buyer must rely to a great extent upon the honesty of the seller.

Some animals will begin to produce and make records in their two-year-old form, others will not produce heavily until the second, third or fourth lactation periods. We realize that a cow cannot transmit qualities that she does not possess. Among animals that have descended from a high-producing family and have been neglected as far as feeding and care are concerned, the tendency will be for the development to go backwards instead of improving.

It has been observed that cows added to the Brookwood herd by purchase did not develop their full producing capacity until after one or two years' residence here, and sometimes not until they were five or six years old. It must remain for the time being an open question whether this late productivity is to be ascribed to the influence of our methods upon the cow herself, or to some inherent peculiarity inherited from her ancestors, and perhaps due to the different methods of feeding, etc., practiced in her original home.

REGISTER OF MERIT BREEDING CHART

As an example of the use of the following table, we take the case of a cow whose test ends on January 1st. From the table we find that the cow should be bred prior to August 1st; that is to say, at the latest on July 31st. Considering this the first day she will

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carry her calf, we find that allowing 31 days for August, 30 days for September, 31 days for October,

REGISTER OF MERIT BREEDING CHART

<i>Test ends</i>			<i>Breed</i>			<i>Test ends</i>			<i>Breed</i>		
			<i>After</i>	<i>Prior to</i>					<i>After</i>	<i>Prior to</i>	
Jany.	1		June 17	Aug. 1	Feby.	1			July 18	Sept. 1	
	2		18	2		2			19	2	
	3		19	3		3			20	3	
	4		20	4		4			21	4	
	5		21	5		5			22	5	
	6		22	6		6			23	6	
	7		23	7		7			24	7	
	8		24	8		8			25	8	
	9		25	9		9			26	9	
	10		26	10		10			27	10	
	11		27	11		11			28	11	
	12		28	12		12			29	12	
	13		29	13		13			30	13	
	14		30	14		14			31	14	
	15		July 1	15		15			Aug. 1	15	
	16		2	16		16			2	16	
	17		3	17		17			3	17	
	18		4	18		18			4	18	
	19		5	19		19			5	19	
	20		6	20		20			6	20	
	21		7	21		21			7	21	
	22		8	22		22			8	22	
	23		9	23		23			9	23	
	24		10	24		24			10	24	
	25		11	25		25			11	25	
	26		12	26		26			12	26	
	27		13	27		27			13	27	
	28		14	28		28			14	28	
	29		15	29							
	30		16	30							
	31		17	31							

30 days for November, 31 days for December and one day for January 1st, that she will have carried her calf 155 days during the test.

REGISTER OF MERIT BREEDING CHART

<i>Test ends</i>			<i>Breed</i>			<i>Test ends</i>			<i>Breed</i>		
			<i>After</i>	<i>Prior to</i>					<i>After</i>	<i>Prior to</i>	
March	1		Aug. 15	Sept. 29	April	1			Sept. 15	Oct. 30	
	2		16	30		2			16	31	
	3		17	Oct. 1		3			17	Nov. 1	
	4		18	2		4			18	2	
	5		19	3		5			19	3	
	6		20	4		6			20	4	
	7		21	5		7			21	5	
	8		22	6		8			22	6	
	9		23	7		9			23	7	
	10		24	8		10			24	8	
	11		25	9		11			25	9	
	12		26	10		12			26	10	
	13		27	11		13			27	11	
	14		28	12		14			28	12	
	15		29	13		15			29	13	
	16		30	14		16			30	14	
	17		31	15		17			Oct. 1	15	
	18	Sept.	1	16		18			2	16	
	19		2	17		19			3	17	
	20		3	18		20			4	18	
	21		4	19		21			5	19	
	22		5	20		22			6	20	
	23		6	21		23			7	21	
	24		7	22		24			8	22	
	25		8	23		25			9	23	
	26		9	24		26			10	24	
	27		10	25		27			11	25	
	28		11	26		28			12	26	
	29		12	27		29			13	27	
	30		13	28		30			14	28	
	31		14	29							

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That is, a cow finishing her test on January 1st can be bred, at the latest, on July 31st preceding

REGISTER OF MERIT BREEDING CHART

<i>Test ends</i>	<i>Breed</i>		<i>Test ends</i>	<i>Breed</i>	
	<i>After</i>	<i>Prior to</i>		<i>After</i>	<i>Prior to</i>
May 1	Oct. 15	Nov. 29	June 1	Nov. 15	Dec. 30
2	16	30	2	16	31
3	17	Dec. 1	3	17	Jany. 1
4	18	2	4	18	2
5	19	3	5	19	3
6	20	4	6	20	4
7	21	5	7	21	5
8	22	6	8	22	6
9	23	7	9	23	7
10	24	8	10	24	8
11	25	9	11	25	9
12	26	10	12	26	10
13	27	11	13	27	11
14	28	12	14	28	12
15	29	13	15	29	13
16	30	14	16	30	14
17	31	15	17	Dec. 1	15
18	Nov. 1	16	18	2	16
19	2	17	19	3	17
20	3	18	20	4	18
21	4	19	21	5	19
22	5	20	22	6	20
23	6	21	23	7	21
24	7	22	24	8	22
25	8	23	25	9	23
26	9	24	26	10	24
27	10	25	27	11	25
28	11	26	28	12	26
29	12	27	29	13	27
30	13	28	30	14	28
31	14	29			

and qualify for Class A A. As, however, this is the *latest* day on which a cow could be bred and meet the requirements of carrying a calf 155 days during

REGISTER OF MERIT BREEDING CHART

<i>Test ends</i>		<i>Breed</i>		<i>Test ends</i>		<i>Breed</i>	
July	1	<i>After</i> Dec. 15	<i>Prior to</i> Jany. 29	Aug. 1		<i>After</i> Jany. 15	<i>Prior to</i> March 1
	2	16	30		2	16	2
	3	17	31		3	17	3
	4	18	Feby. 1		4	18	4
	5	19	2		5	19	5
	6	20	3		6	20	6
	7	21	4		7	21	7
	8	22	5		8	22	8
	9	23	6		9	23	9
	10	24	7		10	24	10
	11	25	8		11	25	11
	12	26	9		12	26	12
	13	27	10		13	27	13
	14	28	11		14	28	14
	15	29	12		15	29	15
	16	30	13		16	30	16
	17	31	14		17	31	17
	18	Jany. 1	15		18	Feby. 1	18
	19	2	16		19	2	19
	20	3	17		20	3	20
	21	4	18		21	4	21
	22	5	19		22	5	22
	23	6	20		23	6	23
	24	7	21		24	7	24
	25	8	22		25	8	25
	26	9	23		26	9	26
	27	10	24		27	10	27
	28	11	25		28	11	28
	29	12	26		29	12	29
	30	13	27		30	13	30
	31	14	28		31	14	31

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the test and there is always the possibility of a cow not holding to a service, an earlier date is also given, fixed arbitrarily 44 days in advance of the latest

REGISTER OF MERIT BREEDING CHART

<i>Test ends</i>				<i>Breed</i>				<i>Test ends</i>				<i>Breed</i>			
				<i>After</i>	<i>Prior to</i>					<i>After</i>	<i>Prior to</i>				
Sept.	1	Feb.	15	April	1	Oct.	1	March	17	May	1				
	2		16		2		2		18		2				
	3		17		3		3		19		3				
	4		18		4		4		20		4				
	5		19		5		5		21		5				
	6		20		6		6		22		6				
	7		21		7		7		23		7				
	8		22		8		8		24		8				
	9		23		9		9		25		9				
	10		24		10		10		26		10				
	11		25		11		11		27		11				
	12		26		12		12		28		12				
	13		27		13		13		29		13				
	14		28		14		14		30		14				
	15	March	1		15		15		31		15				
	16		2		16		16	April	1		16				
	17		3		17		17		2		17				
	18		4		18		18		3		18				
	19		5		19		19		4		19				
	20		6		20		20		5		20				
	21		7		21		21		6		21				
	22		8		22		22		7		22				
	23		9		23		23		8		23				
	24		10		24		24		9		24				
	25		11		25		25		10		25				
	26		12		26		26		11		26				
	27		13		27		27		12		27				
	28		14		28		28		13		28				
	29		15		29		29		14		29				
	30		16		30		30		15		30				
							31		16		31				

day, which will allow one additional service and in some cases two, prior to the time after which the requirements of Class A A cannot be met.

REGISTER OF MERIT BREEDING CHART

<i>Test ends</i>		<i>Breed</i>				<i>Test ends</i>		<i>Breed</i>			
		<i>After</i>		<i>Prior to</i>				<i>After</i>		<i>Prior to</i>	
Nov.	1	April	17	June	1	Dec.	1	May	17	July	1
	2		18		2		2		18		2
	3		19		3		3		19		3
	4		20		4		4		20		4
	5		21		5		5		21		5
	6		22		6		6		22		6
	7		23		7		7		23		7
	8		24		8		8		24		8
	9		25		9		9		25		9
	10		26		10		10		26		10
	11		27		11		11		27		11
	12		28		12		12		28		12
	13		29		13		13		29		13
	14		30		14		14		30		14
	15	May	1		15		15		31		15
	16		2		16		16	June	1		16
	17		3		17		17		2		17
	18		4		18		18		3		18
	19		5		19		19		4		19
	20		6		20		20		5		20
	21		7		21		21		6		21
	22		8		22		22		7		22
	23		9		23		23		8		23
	24		10		24		24		9		24
	25		11		25		25		10		25
	26		12		26		26		11		26
	27		13		27		27		12		27
	28		14		28		28		13		28
	29		15		29		29		14		29
	30		16		30		30		15		30
							31		16		31

CHAPTER VII

FITTING CATTLE FOR EXHIBITION

THE OBJECT of the various cattle and show associations in offering premiums for the best show animals is to furnish an incentive to the farmer to breed the best animals possible. The score card for the ideal type of dairy cow not only selects the points that please the eye, but emphasizes the points that almost always go with high production. The farmer that keeps herd records and can show high and economical production, and can also show type by his winnings in the show ring, is doing a very creditable work, not only for himself, but for the breed of cattle that his herd represents. Aside from the honor and pleasure that he gets in point of sportsmanship, he is showing his animals before the public and advertising his herd, which will result in a greater demand for the progeny of his stock.

In showing cattle, the first and most important consideration is the selection of the animal to be exhibited. This selection must be based on an understanding of the general conformation and type, which is described in the scale of points in the chapters of this book relating to the different dairy breeds. Probably an equally important factor is the training and fitting of the show animals. Success in

this depends upon the aptitude of the show man as a judge, his ability to grasp all the requirements and points of the ideal show cow; and also upon

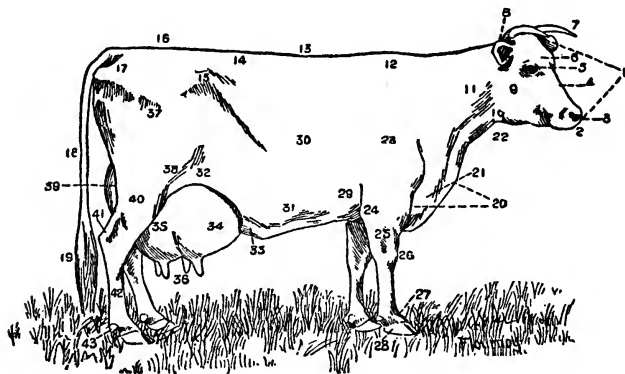


Diagram of Cow Showing Points

1. Head	12. Withers	23. Shoulder	34. Fore udder
2. Muzzle	13. Back	24. Elbow	35. Hind udder
3. Nostril	14. Loins	25. Forearm	36. Teats
4. Face	15. Hip bone	26. Knee	37. Upper thigh
5. Eye	16. Pelvic arch	27. Ankle	38. Stifle
6. Forehead	17. Rump	28. Hoof	39. Twist
7. Horn	18. Tail	29. Heart girth	40. Leg or gaskin
8. Ear	19. Switch	30. Side or barrel	41. Hock
9. Cheek	20. Chest	31. Belly	42. Shank
10. Throat	21. Brisket	32. Flank	43. Dew claw
11. Neck	22. Dewlap	33. Milk vein	

his knowledge, ability and experience in fitting and training animals for exhibition. Usually a very good show animal not in the best of condition will win over an animal with poor conformation; still, it happens not infrequently that a very good animal not in the best of shape will lose to another animal that is not so good, but happens to be in better condition and better trained.

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The beginner or amateur should not attempt to start showing at the larger exhibitions or fairs. He should fit his cattle to the best of his ability, and start in at the local or county fairs, and as he gains experience gradually work up to the larger shows. He will find that it is more encouraging and he will probably have acquired a greater training than by starting at the top.

It is not necessary to use harsh methods, or treatment that will injure the animal in any way. What is to be gained if such stringent methods are used, that the cow, after completing the show circuit, will be for evermore barren and a non-producer? Showing is no doubt more or less of a strain on the animal, but nothing more should be sacrificed than a slight temporary decrease in production. As an example of efficiency in show management, take the case of Beechlands Champion Lily. She freshened February 1, 1916 and in 365 days made 11627.4 lbs. of milk and 628 lbs. of butter fat. During this test she was on the show circuit for six months, and won, among other prizes, first prize for Register of Merit cow at Indianapolis and Southwestern Dairy Show at Kansas City. She dropped a fine vigorous bull calf on April 4th and in the following test she made 14,355.6 lbs. of milk and 829.26 lbs. of butter-fat, and finished the test in excellent condition. Type is good. Production is good. But the ideal cow is one that produces, re-produces, and has show winnings to her credit.

Time required to train and Condition. — It would be impossible to state a definite time in which to



TYPES OF HEADS AND HORNS

Warder's Fern Blossom
Golden Fern's May Belle

Agatha's Maiden Fern
Oxford's Briar Flower

train and fit animals for exhibition. Much depends upon the condition and disposition of the individual. Three months, however, is better than six weeks. The longer period gives us an opportunity to study the animal and study her faults, and gradually correct them by using natural methods. Short time fitting sometimes requires methods that are harmful. For instance at the last minute the herdsman decides that the barrel is underdeveloped, so he must do something at once to fill it out, and resorts to filling her up with slops composed of various grains and liquids, and perhaps gives gallons of this mixture before she is filled out to his satisfaction. He may also find that there are certain places that are hollow, and in order to fill them out he injects paraffine under the skin. Her coat may not be smooth and show real bloom, so he feeds heavily of certain high protein feeds and drugs to correct this condition. She may be sluggish, and he resorts to stimulants and medicines to put the pep in the animal. It goes without saying that these methods are extremely harmful to the future usefulness and value of the animal.

Factors to consider. — During the period of fitting the herdsman should consider the following factors, and keep them always in mind, studying the animal in detail, and watching especially for her weak points and faults. Feeding, grooming, exercise, care of the feet and horns, general condition (hide, hair, flesh, bowels), training (disposition, pose, manœuvring), and finally shipping, and care before entering the ring.

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Feeding. — The feed mixture and the amounts to feed are very important. If the cow is carrying a calf of course this condition will call for a slightly different feed than for a cow not with calf. Linseed oil meal is an important part of the grain mixture as it tends to put a gloss on the hair, but if the quality is not good, or an excess of it is used the results will be more harmful than good. Care should be taken not to overdo any of the factors. The ration and the amount of feed consumed should be watched closely, and the safety point determined, as in feeding for production.

A feed that has produced good results in fitting show cattle is as follows. This mixture can be used as a base to work on, and should be varied slightly according to the individual requirements of the animals. If the animal is in poor flesh and does not gain satisfactorily in weight, add a little more corn meal, or if it is getting overfat reduce the amount of corn meal. The amounts consumed must also be based upon the individual condition and requirements.

Crushed Oats.....	100 lbs.
Wheat Bran.....	200 "
Corn or Hominy Meal.....	100 "
Linseed Oil Meal.....	100 "
Salt 1 %	

In addition to this the cows receive mixed hay, clover, little timothy, red top or rye-grass. A relish of cabbage, beets, etc., helps out. One feeding of alfalfa hay daily is not objectionable, but alfalfa exclusively is too loosening and prevents holding

flesh under shipment. When once a good ration has been established it is best not to change, except to slightly widen or narrow it for certain individuals.

The calves should be fed according to the schedule in Chapter II, except that roots thinly sliced or pulped would be better than ensilage. The calves should not be turned out to graze within six weeks of the show, as at this time the feed should be absolutely controlled. When turned out for exercise they should be in a lot separate from the calves that are not to be exhibited.

Grooming. — The grooming of an animal benefits not only the appearance of its coat but also contributes to its general well-being by keeping the skin and pores in a healthy condition. A bright smooth glossy coat is generally a sign that the animal is in good condition, so that the appearance of the coat is due to both internal and external forces. The pores must be kept open, the skin loose and pliable, and all foreign matter removed. Excessive grooming with a currycomb is harmful. Where there is a spot of dirt or manure on the animal it is all right to rub off with a currycomb, but for general cleaning it should not be used oftener than once every second or third day. The animal should however be groomed twice a day with a brush, not too coarse or hard, and also rubbed off with a soft dry cloth, or the bare hands, using small quantities of an emulsion of equal parts of olive oil and alcohol and plenty of elbow grease. There is a great difference of opinion in regard to the use of blankets. A blanket serves several purposes. It

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affords protection against flies, it helps the hair to lie smooth, and it also hastens shedding. It is, however, best not to use blankets any more than necessary for these purposes. If they are used, they should be of light woolen material. Of course during shipment it may be necessary to cover the animals with blankets to keep out dirt.

Exercise. — During the preparation for exhibition the animals should be kept in a box stall that is well bedded with clean straw or shavings. They should be turned out to exercise in the evening when there are not so many flies to annoy them, and when it is cooler. The exercise lot should contain very little grass. A large share of the exercise is given during the day when they are led out to be trained for show etiquette.

Care of the Feet and Horns. — The feet should be trimmed, not only to add to the appearance, but so that the animal will walk and stand naturally and comfortably. The methods for trimming the feet are described in Chapter IV. Before any attempt is made to trim the horns they should be carefully studied. It is an easy matter at any time to file off part of the shell, but when too much is taken off it may mar the graceful curves and symmetry of the horns. First a wood rasp is used, not only to file off the rough parts of the shell, but to add to the beauty of the curves. On some parts as much as one eighth of an inch may be taken off, while other spots would not need any filing. After the filing so that the horns are as symmetrical as possible, they are smoothed off with a piece of glass, and then



TYPES OF UDDERS

rubbed with a piece of emery cloth. The horns should not be left pointed like a pencil, but the ends should be flattened and rounded off. For polishing the horns various oils and polishes are used. We have found the U. S. metal Polish, in paste form, to be very satisfactory.

General Condition. — In addition to the external show points, the general health of the animal should be closely watched, such as the appearance of the eyes, condition of the hair, pliability of the skin, appetite, bowels, udder, etc. Frequent weighing is also an aid in determining the effect of the feed on the weight. Do not get them in too high flesh; it is harmful to future breeding and milking. On the other hand too lean a condition will not do justice to the cow.

Training. — It is very interesting to watch the exhibitors in the large fairs manœuvring their cattle for position, each trying to gain the place that will show their charge to the best advantage and convenience of the judge, and trying to keep out of pockets. Usually the successful animals have been trained to walk and stand in the positions that show them up best. For instance a certain animal may be best shown by holding its head quite high. Another animal may resent this and would show better if given more freedom. They should also be trained for position in standing, so that the top line will be level, and no unnatural twists appear in the body. The animal should be so trained that if necessary it can be made to move any one foot into proper position, without changing the position of the other

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three feet, by touching it lightly on the offending foot or leg. The cows should also be trained so that the new surroundings and conditions at the show will not cause them undue nervousness, and they should be taught to stand still while being closely examined by the judge. This training of course takes considerable time, and must be done at home before starting on the show circuit. Go through all of the positions and manœuvres that you would be likely to use in the show ring. Allow strangers to look over the animals as the judge would do. Of course a nervous animal requires a longer period to train, and more patience, than one with a quiet disposition, but any animal can be trained to go through all of these exercises. If they have not been faithfully trained, they are likely to do just the opposite of what you want them to do while in the show ring.

Final Care and Shipping. — A few days before shipping date start to prepare a list of articles that you will require in the show circuit. From the time that the cows are loaded on the cars they should be under the constant care and watch of the show man or an assistant. Take care that the animals are not exposed to draughts, and are protected with blankets if exposed to the slightest cold or dust. Arrange to arrive at the show grounds at least 3 or 4 days before the opening of the exhibition. The feed during transit and at the fair should be the same as at home, only during transit the amounts should be reduced to one half. Two or three days before the show each animal should be given a good wash with



WARDER'S FERN BLOSSOM

(Grandaughter of Noble of Oaklands)
At the National Dairy Show, Chicago, Ill., 1919, she won
1st prize Register of Merit cow over 5 years of age.
1st prize Advanced Registry cow with two of her progeny.
1st prize Get of one Sire (4 animals).
1st prize Dairy Herd (5 cows in milk).

tar soap; rub off all of the free water and cover with a light wool blanket until thoroughly dry. The night before the show the tail should be washed and put up in tight braids, and left braided until shortly before the show, when it is unbraided, shaken out and carefully combed so that the tail will have a fluffy and curly appearance. The animals should be given plenty of salt the night before showing and should not be given water for several hours before show time, except a short while before going into the ring, at which time they should be given a good drink of water and their usual feed, which will show the barrel distended, a development that is closely watched for by the judges. The last few hours before going into the ring should be spent in looking over the animals to the last detail, to determine any faults, and making the necessary improvements to correct them.

Last but not least, the show man should thoroughly acquaint himself with the rules of the show, so that he can go through his part with a thorough knowledge of his duties, and without a hitch. The following is a list of the General Rules and Regulations of the National Dairy Show Association, which are in general, similar to the rules of most Dairy Cattle shows:

Application for Entry

Rule 1. All applications for entry must be made on printed forms and in accordance with instructions on same. These forms, properly signed, to be filed in the office of the General Manager of the National

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Dairy Show on or before September 25th, at which time entries close. In all cases the right is reserved to reject entirely or accept conditionally any entry or application for entry.

Stall Rent

Rule 2. A stall fee of \$3.00 per head must in all cases accompany application for entry. Animals will be grouped by breeds. Stalls will be assigned by the Management and will be ready to receive stock on and after three days before opening of the show.

Ownership of Animals

Rule 3. To be eligible for competition, whether singly or in groups, animals must be the bona fide property of exhibitors, except where otherwise specified, and must be owned by exhibitor not less than thirty days prior to the date of closing entries, *and registry certificate of ownership or transfer must be produced, showing exhibitor to be the owner. Such certificate of registration or transfer must be checked by the Management before the animal is exhibited in the ring.* In the classes for "Get of Sire" and "Produce of Dam" ownership shall not be required. Animals to compose a competitive group need not be named in application for entry, but must be selected by exhibitor. Sires of "Get of Sire" and Dams of "Produce of Dam" to be named at time of making entry.

Rule 4. The owner of the dam at time of service shall be considered the breeder of the animal.

Firms and Co-Partnerships

Rule 5. Firms and co-partnerships entering animals for competition must be in existence sixty days prior to the date of closing of entries and in all cases must be bona fide, and affidavits of the age of firms may be required by the Management. Firms or co-partnerships entered into for show purposes will not be recognized by the Association, but cattle bred by a member of the firm or company shall be considered as bred by the company. Should a temporary sale or transfer of a show animal ever be discovered, the exhibitor and proper owner may be barred from any or all future shows.

Eligibility for Competition

Rule 6. Every female over thirty-six months old must have produced a living calf within the past eighteen months or prove to be with calf. Every bull thirty-six months old must have had dropped to his service a calf, within the twelve months previous to the opening date of this show, to be eligible to compete.

Catalog Numbers

Rule 7. Each entry will be assigned a number in the official catalog and exhibitors on their arrivals at the show will receive on application, tags with duplicate numbers to correspond with the catalog number, which must be displayed by attendant when animal is in the judging ring or on parade.

Erroneous Entry

Rule 8. Exhibits that have been erroneously en-

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tered may, in the discretion of the General Manager, be transferred to their proper classes previous to the judging. If such classes have been judged they shall not be reopened.

Substitution

Rule 9. No person having entered anything for competition will be allowed to make substitution of animals or otherwise change the entry after ten days prior to the opening day of the Show, except as noted in rule 8.

Base Dates of Ages

Rule 10. The ages of all animals shall be reckoned from date of birth to the first day of August, except Junior classes, which shall be reckoned from February 1st of the current year.

EXHIBITORS

Care of Animals

Rule 11. Exhibitors after having properly entered their animals must themselves see to their delivery to the Superintendent of their breed division, so that their exhibits may be in their places properly ticketed and ready for competition by 9.00 A.M. of the opening day of the Show. They are likewise required to attend to their animals while on exhibition, and answer such questions as the judges may deem essential to a correct estimate of their relative value.

General Rule

Rule 12. All animals for exhibition must be in their places with clean stalls at 5:00 P.M. of the opening day of the Show, to remain on the grounds until the close of the Show, exhibitors being responsible for care and feeding of their animals. Any violation of this rule will cause a forfeiture of all premiums won by the exhibitors. All exhibits of animals arriving in carload lots can be unloaded from the cars at the Exposition grounds. Consign all cattle: "National Dairy Show, care Ohio State Fair Grounds, Columbus, Ohio."

Feed and Bedding

Rule 13. On account of the limited storage room and to prevent obstruction of aisles, exhibitors are not permitted to bring hay, bedding, oats, shelled or ear corn into the barns, but may bring ground or other feed to be stored subject to instructions of Superintendent.

Use of Blankets

Rule 14. Exhibitors are prohibited from using blankets or covers on their stock during exhibition hours, viz.: From 9:00 A.M. to 5:00 P.M. and from 7:00 to 10:00 P.M.

Uniforms

Rule 15. No attendant or other person leading animals will be allowed to enter arena unless properly uniformed. Uniforms may be rented at reasonable rates.

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Milking Out

Rule 16. It shall be the duty of the Superintendent to see that all cows have been milked out clean not earlier than 5:00 P.M. on the day preceding judging.

Evening Shows and Refusal to Parade

Rule 17. A great educational feature of the National Dairy Show is its evening shows and parades of approved live stock by breeds and ages. Notices of time and places of parades will be announced by bulletins and stewards, therefore:—Exhibitors refusing for any cause not meeting with the approval of the Management to lead out their animals for parade or for competition in the show ring or for students' judging contests, when called by the Superintendent in charge, will not only forfeit all prizes previously won, but the Executive Committee may further impose such additional penalty as in its judgment the case deserves.

Arena Privileges

Rule 18. No person other than those holding animals being exhibited will be allowed in the show ring during the time of judging, except the Superintendent of the division, the Judge and officially accredited reporters. This rule will be rigidly enforced.

Catalog Number

Rule 19. No animal shall be considered by the awarding committee whose attendant is not displaying correct number tag during competition.

Removal of Exhibit

Rule 20. Any exhibitor wishing to remove an exhibit for the night must apply to the General Manager, and if there appears to be good reason for the removal it may be effected by leaving a suitable deposit and receiving an official pass, the time of leaving and that of returning to be inserted thereon and if the exhibit be not duly returned, the deposit will be forfeited to the Show Association.

Delivery of Animals

Rule 21. Exhibitors will not be allowed to deliver animals or articles during the Show (though they may receive and book orders, nor will they be permitted to call attention to their wares in any noisy or disorderly manner and only such signs and placards may be used as the General Manager shall approve and allow.

Conduct

Rule 22. Any false representation, interference or ungentlemanly conduct on the part of an exhibitor will be dealt with by the Executive Committee according to the equities of the case.

Protests

Rule 23. All protests must be in writing and accompanied by a deposit of \$20.00, which will be forfeited if protest is not sustained. Such protest must state plainly the cause of complaint, or appeal, and must be delivered to the General Manager within six hours after the occasion for such protest.

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Appeals

Rule 24. No appeal of or appeal from an award based upon a statement that the judge or judges have overlooked an animal will be considered by the Executive Committee.

Points Considered

Rule 25. The fundamental object of the National Dairy Show Association is to encourage the breeding of improved breeds of dairy cattle. Regard will be had for symmetry, size, form, constitution, vigor and general characteristics. Due regard will also be paid to graceful carriage, style and general refinement that denotes breed character and which adds value. In groups encouragement will be given to uniformity of breed type.

Barren Animals

Rule 26. The National Dairy Show debar and will to the utmost of its power discourage and prohibit the exhibition of barren animals.

Health Certificates

Rule 27. All entries of cattle over six months old, whether for exhibition or educational purposes, shall be provided with individual Certificates (showing temperatures) issued by a responsible and registered Veterinarian, definitely describing each animal and showing that they have been tuberculin tested within six months prior to the opening of the Show, and also all other precautions that may be necessary concerning the general sanitary condition of the

herds on exhibition and of the quarters occupied by them shall be carefully supervised by the Official Veterinarian of the Show Association.

Official Veterinarian — Sick Animals

Rule 28. The General Manager will appoint a veterinary surgeon and such other assistants as may be necessary. The veterinary surgeon shall make inspection of the grounds, stables and stalls, and make report in writing of the condition in which said grounds, stables and stalls are kept. In case of sickness of any animal, the same shall be removed when ordered by the General Manager to a separate enclosure, where the exhibitor may either direct the treatment of the animal himself or employ a veterinary surgeon appointed for the purpose, for whose services and other necessary expenses incurred, a reasonable charge will be made by the Association. The right is reserved to the General Manager to order the peremptory removal from the grounds of any animal to which this rule applies.

Liability

Rule 29. All exhibits will be under the control and direction of the General Manager, but the National Dairy Show Association will in no case be responsible for any loss or damage that may occur. Each exhibitor will be solely responsible for any loss, injury or damage done to or occasioned by or arising from any animal or article exhibited by him, and for its description as given in the catalog, and shall indemnify the Association against legal or other proceedings in regard thereto.

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Interpretations

Rule 30. The Association reserves to its Executive Committee the final and absolute right to interpret these rules and regulations and arbitrarily settle and determine all matters, questions or differences in regard thereto, or otherwise arising out of, or connected with or incident to the Show.

Amending Rules

Rule 31. The Association reserves the right to amend or add to these rules, as the Executive Committee in its judgment may determine.

JUDGES

Unworthy Exhibits

Rule 32. Judges must not award a prize to any unworthy exhibit. It is the intention of the Association that no premium or distinction of any kind shall be given any article or animal that is not deserving.

Awarding Prizes

Rule 33. Where there are fewer entries in any class than the number of premiums offered, judges may, in their discretion, award a prize or prizes of such grade as the animal or article deserves.

Rule 34. In awarding the premium in classes for cow having official yearly record, the judge shall assign each entry a definite number of points for conformation on the basis of 100 for perfect; to this shall be added one point for each twenty pounds of

butter fat above 250.5 for a two-year-old with an additional minimum requirement of one tenth of a pound for each day the heifer is over two years old, up to a total of 360 pounds minimum requirement for the mature cow. Only such records shall be accepted as are certified by the Secretary of the registry association as having been made under the supervision of experiment station or agricultural college, as required for official or semi-official tests.

Rule 35. Only as many prizes shall be awarded in any one class as there are exhibitors present.

Interference with Judges

Rule 36. Judges shall report to the Superintendent any exhibitor or exhibitors who in any way, whether in person or by agents or servants, interferes with them during their adjudication, or shows any disrespect to them, whereupon a proper apology from such exhibitor shall be demanded, or he may exclude such exhibitor from competition, and the Association may withhold from such exhibitor any premiums that may have been awarded to him.

Decision of Judges

Rule 37. The decision of the judges shall be final in all cases, except where mistakes, fraud, misrepresentation or collusion, not discovered at the time of the award, is proven. In such cases the General Manager, or such referee as he may appoint, may make decision, or with his approval the case may be appealed to the Executive Committee, from whose decision there can be no appeal.

Animals Disqualified

Rule 38. Should any animal awarded a cash prize be disqualified, the animals gaining the lower prizes shall graduate up into the higher position next in order above them, if in the opinion of the judges these animals are worthy of such prizes.

The various classes at the National Dairy Show, for which prizes are awarded are as follows — *Class 1.* Bull, 3 years old or over. *Class 2.* Bull, 2 years old and under 3. *Class 3.* Bull, 1 year old and under 2. *Class 4.* Bull calf, 6 months old and under 12. *Class 5.* Bull calf, under 6 months. *Class 6.* Cow, 5 years old or over. *Class 7.* Cow, 4 years old and under 5. *Class 8.* Cow, 3 years old and under 4. *Class 9.* Heifer, 2 years old and under 3. *Class 10.* Heifer, 18 months and under 2 years. *Class 11.* Heifer not in milk, 1 year and under 18 months old. *Class 12.* Heifer Calf, 6 months old and under 12. *Class 13.* Heifer Calf, under six months old. *Class 14.* Cow having official yearly record begun at 5 years or over. *Class 15.* Cow having official yearly record begun under the age of five years. *Class 16.* Exhibitors Herd. *Class 17.* Young Herd. *Class 18.* Breeders Calf Herd. *Class 19.* Get of one sire. *Class 20.* Produce of one cow. *Class 21.* Advanced Registry Cow, with two of her progeny. *Class 22.* Advanced Registry Cow, with two of her progeny. *Class 23.* Dairy Herd, 5 cows in milk. *Class 24.* Senior Champion Bull, 2 years old or over. *Class 25.* Junior Champion Bull, under 2 years. *Class 26.* Senior Champion Cow, 2 years old or over. *Class 27.* Junior

Champion Cow, under 2 years. *Class 28.* Grand Champion Bull. *Class 29.* Grand Champion Cow. *Class 30.* Breeder Winner of most money on animals bred by exhibitor. *Class 31.* Exhibitor winner of most money. In addition to these, various special prizes offered by individuals and the various cattle associations.

CHAPTER VIII

HOUSING OF THE CATTLE

IN order to obtain the best results from your cow herd, it is essential that all conditions relating to their welfare be as nearly as possible ideal. We have in preceding chapters dealt with the best methods of feeding and breeding. Another factor that requires careful attention is the housing of the cattle. The cows must be comfortable and contented and in a healthy condition. Their original ancestor was a wild animal and lived a free roaming life in the open. Since man has taken up the development of the cow as a domestic animal he has come to realize that cow's milk and the products derived therefrom have peculiar virtues as food materials, in which they are equalled by no other food, so that they have become indispensable to human communities. The demand for these products has accordingly become so great that it requires an enormous number of milk cows to supply it.

In order to make a dairy profitable the farmer must keep a large number of cows in the smallest space possible, and still have ideal conditions, even though under unnatural circumstances. The dairy cow under the proper living conditions is a very hardy animal, but it cannot stand living out of doors

during our severe winters, in the northern and central parts of the United States. The ideal living

DIST. No. _____

NEW YORK
STATE DEPARTMENT OF HEALTH
ALBANY

It is some 100%

DAIRY INSPECTOR'S REPORT

Score Card for Market Milk

Inspection No. 37 Time A. M. 4 P. M. Date Sept. 25, 1918
 Dairyman W. H. Robertson Owner Wm. Robt. Proctor
 Address Barnville, N. Y. Address Barnville, N. Y.
 Party interviewed W. H. Robertson Creamery Port Jervis, N. Y.
 Operated by Port Jervis Dairy Company
 No. cows 65 No. milking 40 Quarts milk produced daily 4,801
 Cows examined physically on Feb. 15-16, 1918 By licensed veterinarian Dr. Schriener
 All persons in households of those engaged in producing or handling milk are _____ free from listed diseases
 (tuberculosis, typhoid fever, scarlet fever, septic sore throat, diphtheria, infantile paralysis and dysentery)

Date and nature of last case _____

Water supply for utensils is from a Artesian Well, located 280 feet deep and
 apparently is _____ pure and wholesome.

State any possible contamination located within 200 feet of source of water supply or if water supply is not protected against surface drainage _____

Stanchions on stalls 48 Use space 40,059 cu. ft.

EQUIPMENT	Perfect Score	ALLOWED SCORE	METHODS	Perfect Score	ALLOWED SCORE
COWS (2)			COWS (12)		
Cows apparently healthy and in good condition	2	<u>2</u>	Belly, flanks, udder and teats clean at time of milking	8	<u>8</u>
COW STABLE (8)			Udders, teats and flanks wiped with clean damp cloth before milking	4	<u>4</u>
Cow stable adequately lighted (2 sq. feet of windows for each 500 cu. ft. of air space)	2	<u>2</u>	COW STABLE (4)		
Cow stable adequately ventilated. (King System)	2	<u>2</u>	Cleanliness of stable a) floors	2	<u>2</u>
Floors sound and capable of being kept clean (Concrete)	1	<u>1</u>	(b) walls and ceiling	1	<u>1</u>
Drops constructed of concrete or some nonabsorbent material	2	<u>2</u>	Manure removed daily to at least 50 feet from stable and not accessible to cows	1	<u>1</u>
(Constructed of wood and watertight, 1)	1	<u>1</u>	UTENSILS (12)		
Walls and ceiling tight	1	<u>1</u>	Utensils rinsed with clean, cold water promptly after using	2	<u>2</u>
UTENSILS (20)			Utensils scrubbed with brush and solution of alkali	2	<u>2</u>
Milk pails of metal, smooth, in good repair; seams soldered flush	2	<u>2</u>	line washing powder and rinsed with clean water	2	<u>2</u>
Milk cans and lids of metal, smooth, in good repair; seams soldered flush	2	<u>2</u>	Utensils scalded with boiling water or live steam immediately before use	6	<u>5</u>
Strainers in good repair (cotton or cheese-cloth preferred)	2	<u>2</u>	(Sterilized with boiling water or live steam and kept in clean place until used, 2)	3	<u>3</u>
Racks provided in a clean, light place to hold cans, pails and strainers when not in use	2	<u>2</u>	Utensils used for no other purpose than the care and handling of milk	3	<u>3</u>
Ample supply of boiling water	3	<u>3</u>	MILKING (11)		
Milking pails of small mouth design, top opening not exceeding 8 inches in diameter	6	<u>6</u>	Milkers' hands clean and kept dry during milking (If milk machine used 5)	5	<u>5</u>
(If milking machine is used, 6)	6	<u>6</u>	Milk strained in milk house or other clean place removed from cows	2	<u>2</u>
Cooling tanks of cement, metal or wood, with capacity for all milk cans and depth to bring water to neck of cans	3	<u>3</u>	Milkers wear clean clothing	2	<u>2</u>
MILK HOUSE (7)			Milking stools clean	2	<u>2</u>
Milk house (a) sufficient light	1	<u>1</u>	COOLING (17)		
(b) sufficient ventilation	1	<u>1</u>	Ice supply sufficient for entire season	5	<u>5</u>
(c) properly screened to exclude flies	3	<u>3</u>	Night's milk cooled with ice immediately after milking and maintained at a temperature of 50 degrees F.	8	<u>8</u>
(d) no direct opening into cow barn	1	<u>1</u>	(With running water and maintained at a temperature of 60 degrees F., 4)	4	<u>4</u>
(e) floor properly graded and water-tight	1	<u>1</u>	Morning's milk cooled to a temperature of 60 degrees F.	4	<u>4</u>
COW YARD (3)			MILK HOUSE (2)		
Cow yard graded, drained	2	<u>2</u>	Clean	2	<u>2</u>
Friery screened and not located in or drained to cowyard	1	<u>1</u>	COW YARD (2)		
			Clean	1	<u>1</u>
			Friery-clean	1	<u>1</u>
Total	40	40	Total	60	60

W. H. Kinsley,
 Milk Inspector

conditions for them of course would be if they were kept in a climate where they can live out of doors and graze on rich legume pastures the year round,

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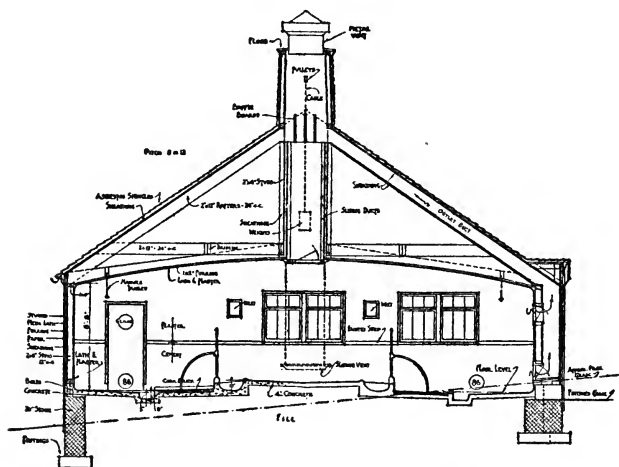
but as milk is a perishable product and must be delivered daily, the farmer is compelled to keep his cows within a reasonable shipping distance of the largely populated centres. He should aim to have the housing conditions as nearly as possible like the natural conditions of the warmer climates. The ideal method of stabling would be to have a separate box stall for each cow. But the cost of a barn large enough to accommodate a herd by this method would be prohibitive. For this reason we have been forced to use the stanchions for a tie, and to keep the cows in a straight stall. This is found very satisfactory, providing the cows are given sufficient exercise. This method allows about 21 square feet per cow. A box stall would require about 80 square feet.

In planning the barn several other factors must be considered. We will now consider

Type of construction and material. — This is governed somewhat by the amount of money that is to be invested in the building, and the climatic conditions. In sections where concrete or hollow tile can be secured economically, the use of this material would probably in the long run mean money saved. It gives a permanent, absolutely fireproof construction and avoids future repair bills. It makes an excellent foundation for a stucco finish, which need not be painted every few years, as is necessary with the wood finish, to protect it from the weather. On the other hand many cow barns are constructed entirely of wood, with concrete floors and produce certified milk with a low bacterial count.

Location and accessibility. — In cold climates the

building site should not be exposed too much to the cold winds, since this would make it harder to keep the barn at a comfortable temperature. The barn should be located in a north-south position, so that at some time during the day the sun will shine in the windows on each side. Sunlight is one of the greatest forces in destroying germs. The water supply is also important. Gravity feed is of course the best system, either from a storage tank or spring.



CROSS SECTION OF COW BARN

Alfred Hopkins, Architect

But under no condition should the location be finally decided upon until you are sure of the water supply. A side hill with a southern exposure and natural slope to carry off the surface water is the ideal location. The exercise yard should always be on the lower side of the barn. The location should

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be convenient to the main roads for hauling to and from the market, and also convenient for hauling the crops to the barn, especially where the soiling system is used. The relation of the main cow barn to the hay and grain storage, root cellar, milk receiving room and dairy should be considered both from the sanitary and labor-saving standpoint. These buildings should all be under the same roof, but not directly connected with each other. The hay chute and feed bins should be located so that during the preparation of the feed, or lowering of the hay, no dust will get into the milking barn; yet they should be directly adjoining the milking barn, so that time and labor will not be lost in delivering the feed to the cows. The milk from each cow should be weighed before pouring it into the receiving tank, but the practice of pouring it into a forty-quart pail that is standing at the back of the cows should be discouraged from a sanitary standpoint. The milk from each cow should be weighed and poured into a receiving tank in a separate room used only for that purpose. This milk receiving room should be located conveniently relative to the milk cows, so that too many steps will not be lost in delivering the milk to the receiving tank.

Good ventilation.— This is another factor that helps in producing milk, as the maximum production cannot be obtained unless the cow is in good health, and good ventilation is essential to good health.

The score card of the State Department of Health should also be studied carefully so that the build-

ings, equipment and methods will score as near 100 per cent as possible.

The following is a description of the farm buildings at Brookwood Farms. A great deal of time and study was given to the plans to make the barns as convenient and practical as possible. While it may not be possible for all to follow this exact type of construction, the general outline, floor plans and conveniences can usually be carried out about as described and will be found most practical and economical.

The main cow barn is located in a north-south position, on a gradual slope facing the east, and on a drive about three hundred feet from the main highway. The foundation is built of stone that was gathered on the farm. It is deep enough under the ground to be below the frost line, and high enough above the ground so that the floor level is about six inches higher than the highest point of ground adjoining the barn. The ground slopes gradually to the east and south, so in order to economize on labor and material for the extra mason work and fill, and to improve the appearance of the barn, it is built on four different levels, corresponding to the levels of the grade. A ramp connects each floor level, the slope of which is gradual enough to permit a cow to walk up and down with ease, and to permit the feed trucks to be wheeled from one section to another.

Milking Barn. — The main milking barn is 123 feet by 37 feet. It has a double slant roof covered with asbestos shingles. The construction is arranged

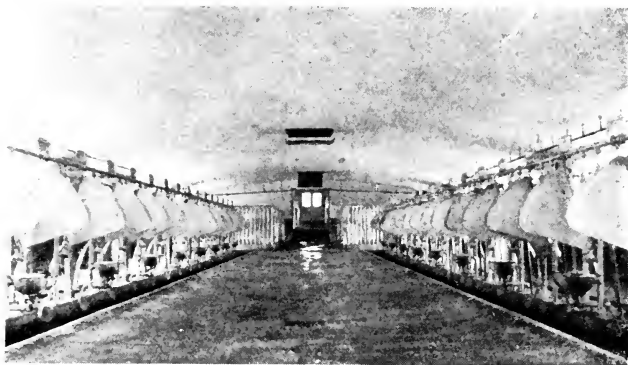
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so that there are no posts or columns inside the barn, the entire weight of the roof and ceiling resting on the side walls. It contains 40 stanchions and 8 box stalls for test cows.

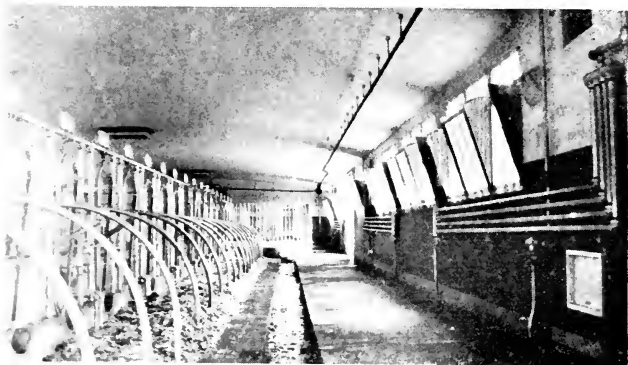
Floor Construction. — All floors except the stall platforms are of cement. The surfaces over which the cows walk are finished with a wooden float and left as rough as possible to prevent the cows from slipping. Dirt or wood floors are very hard to keep clean, and the extra cost of cleaning and repairing them would make the cost, considering a term of years, much greater than that of concrete, which is the most economical and sanitary flooring used.

Stall platforms. — All stall platforms under the cows are covered with cork-brick imbedded in the concrete. A concrete floor is always cold, and a cow lying with her udder directly on this floor will sooner or later contract a serious udder trouble, that may result in the loss of one or more quarters. Cork bricks are used mainly as a preventive of this trouble. They are waterproof and therefore keep the dampness from the floor surface. They are also warmer and less slippery than cement, and will last a lifetime. The cork brick should extend from the front curb to the edge of the gutter, and at this point should be held in place by a strip of angle iron. The sharp edge should be rounded off with a blacksmith's rasp. We have never had to replace any of these bricks, and if properly laid they will not break or crack.

Arrangement of cows in barn. — The cows are arranged in two rows of stanchions with their heads



FEEDING ALLEY



STANCHIONS, STALLS, GUTTER, ETC.

facing the centre, or the feeding alley. We believe this to be the best arrangement where there is a space of eight or ten feet between the cows facing each other. If the centre alley were only four feet wide, the cows would breathe or cough in the faces of those opposite, and of course there would be a greater danger of disease spreading should it develop in the herd.

Some barns are constructed with double doors at each end of the centre passage, so that a team and wagon can drive in at one end and out at the other. The object is to shovel the manure from the gutters to the wagon or manure spreader as it passes through the barn and haul it directly to the fields, thereby saving the labor of removing it with litter carriers. The objection to this is that a farm box wagon or manure spreader is seldom built tight enough to prevent the liquid from dropping through to the passageway, causing a bad odor, and very unsanitary conditions. In this arrangement the cows face the outside, with the direct sunlight in their eyes, and the gutters, that really require sunlight more than any other part of the barn, are in the shade. No matter how the cows are arranged there will be three separate operations. If they face out, the distribution of grain, hay and silage down two different alleys, and cleaning the manure from the third alley, and vice versa when they face the centre.

Alley-ways. — The cross section of the barn illustrates the position of the cows and the alley-ways. The barn is 37 feet wide, inside measurements. The alley back of the cows is 6 feet wide,

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with a slope toward the gutter of one inch, and is of roughened cement to prevent slipping. The center alley is ten feet wide between the mangers, and the surface finished off smooth.

Gutters. — The gutters in these barns are 16 inches wide. This width is very satisfactory provided the stanchions are adjustable and can be regulated for cows of different lengths, so that the manure will not drop on the platforms or on the alley back of the gutter. The depth of the gutter depends upon whether they are cleaned out through the night, or whether the manure is allowed to accumulate until morning. In the latter case the gutters should be from 7 to 10 inches deep, which allows plenty of room for the night's accumulation of manure without soiling the cow. We have a watchman in the barn all night, and he cleans the gutters frequently, so that it is not necessary to have the gutters so deep. The depth at the shallowest point is four inches below the platform, and gradually slopes to the bell traps a distance of 16 feet, so that at this point it is six inches deep. We have built the gutters as shallow as possible to prevent injury to a cow from slipping, as there is great danger of this in deep gutters. The corners are all square so that they can be cleaned out very handily with a square pointed shovel. The drains are connected with two bell traps, only one of which is open at a time. When the cows are in the barn the trap leading to the manure pit is open, so that the liquid manure will run into this pit. When the barns are being scrubbed this trap is closed and the one leading



HOISTING MACHINERY IN OPERATION

to a septic tank is open. This is arranged so that the wash water will not run into the liquid manure and dilute it.

Mangers. — The mangers are built of cement and are continuous, that is, they run the whole length of the cow stalls without a break. The level of the bottom of the mangers is about two inches higher than the level of the stall floor. If this level were

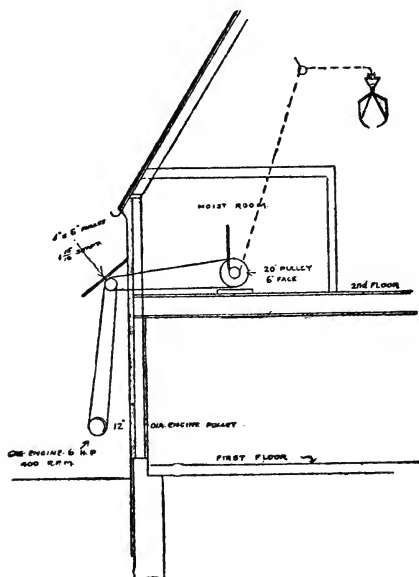


Diagram of Hoist Machinery

the same as the stall floor we would find that after the bedding is in place the cows would be eating from a level lower than their feet. The bottom of the manger slopes slightly to an outlet directly opposite the bell traps in the gutter. The curb on the inside

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of manger is 12 inches high and 5 inches wide. Directly under each stanchion the curb is cut out in a half circle, the top of which is 12 inches wide and 5 inches deep. If the curb is less than eight inches high the cow will push a considerable part of the grain back into the stall. There is an iron division in the manger separating neighboring cows. It is fastened to the uprights that support the stanchions, and hinged so that it can be lifted up out of the way. The divisions are essential for Register of Merit feeding, as without them a fast eating cow will steal as much as one or two pounds from her slower neighbor, for which theft she is liable to be punished by digestive troubles. The width of the manger is 30 inches, and the alleyway is on a level with the top of the manger. The cows will push some of the grain over on the alleyway, but not so far that they cannot reach out and draw it back again. They will frequently throw the hay out beyond their reach, but it is a very simple matter to push it back into the manger. In one of our older barns the feeding alley is built on a level with the bottom of the manger, and both the grain and hay have to be gathered from the floor and thrown back into the manger after it has been pushed out by the cows. This happens probably several times before they have cleaned it up. We believe the elevated feeding alley to be the most satisfactory.

Ties. — We use wood-lined metal stanchions for a tie. The wood lining is used as a protection for the cow's neck against the cold iron. The frame on which the stanchions hang is built of two-inch iron

pipes. The uprights are imbedded in the concrete curb that divides the manger from the stall platform. The stanchions are attached on the top by a chain fastened to the iron pipe, and on the bottom with a chain fastened to a lag screw imbedded in the concrete curb. These chains are slack enough to allow a play of about three inches in any direction, so that when the cow lies down she can comfortably turn her head around against her side, with her chin resting on the platform.

The stationary wood stanchions attached firmly at the top and bottom are good enough for a tie to hold a cow in the stall, and are probably a little cheaper to install than the swinging stanchions, because they can be made by the farmer with ordinary boards, but they do not allow the freedom of movement and cause just enough discontentment to affect the milk flow. I believe that the extra cost of the swinging stanchions will be more than repaid in a short time by the additional milk flow due to the increased comfort and contentment of the cow.

Another form of tie that is used is a collar around the neck of the cow, with a chain attached to each side of the collar, the other end of the chain being fastened to a metal ring that fits loosely around an upright pipe located in a position similar to the pipes that are used for the frame to support the stanchions. This system may give the cow's head a little more freedom of movement, but if the chains are left loose enough for her to lie down in a comfortable position with her head against her side, she will either stand with her feet in the gutter and drop the dung on the

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alleyway, or else too far forward and drop the dung on the stall platform, making it exceptionally difficult to keep the cows clean.

Partitions between cows. — The simplest and most sanitary partitions are the single iron pipes, bent as illustrated, attached to the upright frame about three feet above the platform, and extending back about three feet. Solid partitions are not to be recommended, as they hinder the circulation of air, are harder to keep clean, and, if made of wood, are breeding places of disease. The object of most farmers who use the solid partitions is to prevent injury from a cow stepping on its neighbor's udder. But we have never had an accident resulting from the use of the single pipe partitions.

Automatic Watering Cups. — The advantages of individual drinking cups for cows are three-fold. They save the labor of carrying water to the cows in buckets, or of turning them out to drink from a trough. They are sanitary and help to prevent the spread of disease, because each cow drinks from her own cup, and avoids the possibility of drinking water that may be contaminated by other cows. Furthermore with this arrangement the cows have access to fresh water at all times. This is an important factor in milk production, as milk contains about 85% of water. There are times when a cow will refuse water, and a half hour later would drink several gallons. Drinking cups are placed just in front of the upright pipe that forms the frame for the stanchions, so that the cow can conveniently reach it by turning her head to the side; yet not too

lids fall back in place. The water level in the cups is controlled automatically. The water runs through a small tank located in the milk receiving room, and on a level with the water cups in the barn. In this tank is a copper ball float, that floats on the water, and also connects with the inlet valve. As the cows

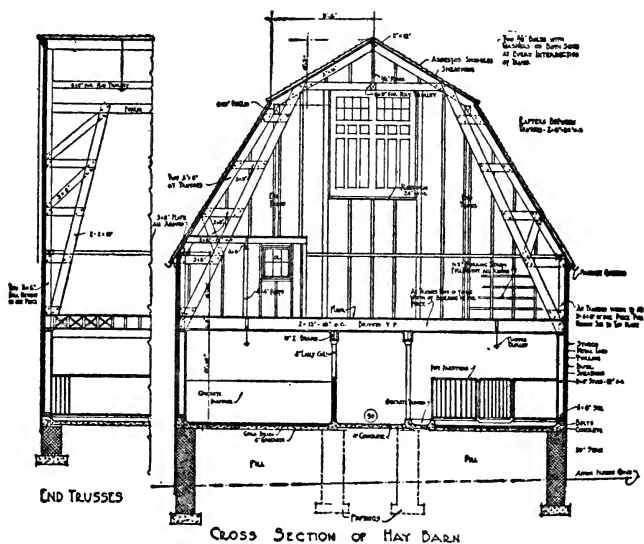
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lower the level by drinking, the float falls and automatically opens the inlet valve, which allows the water to run into the tank until the proper level is again reached. The inside of the cups should be thoroughly cleaned at least once each week.

Windows — The production of sanitary milk depends upon its low bacterial count and the health of the cows depends very largely upon the sanitary conditions of the barn. Sunlight is one of the greatest forces in destroying germs, and in barns where sunlight is lacking we usually find foul odors and damp conditions. Therefore the importance of having sufficient sunlight in the barns cannot be overestimated. There should be at least two square feet of windows for every 600 cu. feet of air space. We have used as many windows as the construction of the buildings would allow. They are four feet above the floor, and measure 3 feet by 4 feet. They are built in two sections, as illustrated. Our severe winter climate (at times the thermometer is 30 degrees below zero) necessitates the use of storm sash. In summer the storm sash is replaced with shutters, arranged with slats so that they can be opened to admit the sunlight. The object of the shutters is to keep the barns cool during the hottest part of the day, and to give protection against flies.

The windows are not hinged, but fit snugly in the frame, and are held closed by a snap lock on top. On each side of the window is a solid metal frame, extending on the inside of the barn, so that when the windows are open there is a space of ten inches for the air to come in over the top.

Ventilation.—A proper system of ventilation should provide for a continuous renewing of the air in the barn without creating a draft or making the temperature uncomfortably cold. We have read that sunlight is unfavorable to dampness, but good ventilation also is essential as a preventive of damp conditions. Probably the most successful system of



Alfred Hopkins, Architect

ventilation is the King System, as originated by the late F. H. King whose remarks on this subject are worth quoting. From the De Laval Separation Co. booklet.

“If, on going into a stable in the morning in comparatively mild weather, dampness is evident on the walls and ceiling, this is a pretty clear indication that

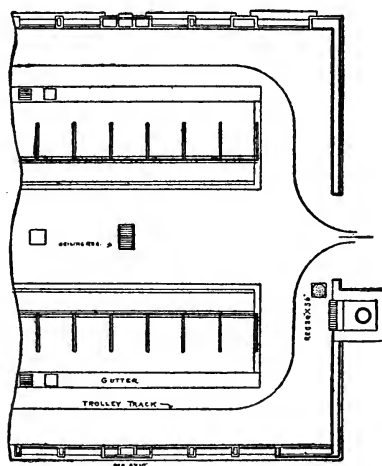
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a sufficient amount of air is not passing through. Every cow in your stable above 1000 pounds in weight throws into the air, from lungs and skin, during each 24 hours, an average of more than 10 pounds of moisture. If you do not have air movement sufficient to contain this moisture as it passes through the stable, it must condense on the walls.

“Oxygen of the air is as indispensable a part of the food of the cows as is the fodder and grain you give them. The amount of air necessary to supply the oxygen is really very large, and equals in weight more than 2.5 times the feed and water combined, even where each cow breathes perfectly fresh air. Outtakes and intakes for horses and cows should provide not less than 30 square inches per head when the outtake has a height of 30 feet.

“A ventilating flue 2 by 2 feet, through which the air moves at the rate of a little more than three miles per hour, gives sufficient air for 20 cows. The ventilating shaft is essentially a chimney, acts on exactly the same principles, and should have all the essential features of a good chimney. Its walls must be air tight from top to bottom except where it is intended that the air should enter. It should be of the same diameter throughout; as nearly straight as possible; it should rise above the highest part of the roof where the wind can have free sweep across its top. The longer the ventilating shaft, just as in the case of the chimney, the stronger the draft. I would urge the use of galvanized iron for the ventilating shaft, so as to ensure permanently air-tight walls. It is not sufficiently appreciated that the ven-

tilating flues should be as few as practicable, on all sides of the stable if possible, and small. As the air is fouled, deprived of its oxygen, and breathed toward the floor; and as all air must be inspired from near the floor, the exhaust should be continuously and as fully as possible from the floor because then, not only will the fouled air be mechanically



Floor Plan, Calf Barn

drawn from this level, but the warmed and pure air will be forced to the floor where it is used.

“Of course air cannot flow continuously from the stable unless an equal volume of air flows into it, and so, no matter how many ventilating flues you have, there can be no ventilation without intakes. Perfect ventilation and a warm stable combined can only be had with a thoroughly tight ceiling. By

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making the fresh air intakes open at the ceiling, on the inside, and open near the level of the stable floor on the outside, it becomes impossible for the warm air of the stable, which collects at the ceiling, to pass out at the ceiling opening, as it would do if the outside opening were on a level with the inside opening."

The system of ventilation used at Brookwood Farms is a slight modification of the King system. The drawing illustrates the plan of inlets and outtakes.

Grain storage room. — The grain storage barn and feed room are built on the end of the milking barn. The feeding alley runs in a straight line through both buildings. The buildings are separated by a stone wall 18 inches thick, which extends above the peak of the roof. The doors in this wall are automatic fire doors, so that if either building should catch fire it would be impossible for the flames to spread to the other building.

Second floor. — The grain storage, feed bins and mixing platform are all in one room on the second floor. The floors, walls and ceiling are lined with a fine mesh wire rat-proofing. There are four bins, one for the milk ration, one for dry cow ration, one for beet-pulp and one for calf ration. The grain is mixed on the platform, shovelled into the bins, and finally dispatched to the feed room downstairs through a galvanized pipe.

First floor. — In addition to the grain chutes, the silage and hay chutes and the bedding room all open into the feed room on the first floor, and with a

trap door to the root cellar in the basement, all of the feed and bedding for the cows must be delivered through the feed room.

Basement. — The stairs in the corner of the feed room lead to the root cellar underneath. The floor and walls are built of concrete and water-proofed with a 5-ply felt and pitch waterproofing. The ventilation is controlled by one intake and one outlet through the roof. There are four storage bins, built of four-inch boards, with an inch space between to allow a free circulation of air.

Hay storage and bull barn. — This barn directly adjoins the grain storage building. The feed alley also continues through this building to the exercise shed. The entire second floor is an open loft for the storage of hay. The hay is lowered through the hay chute, built out from one side of the loft, and emptying into the feed room downstairs.

One half of the first floor is used for bull pens. Each pen is 14 feet square, and is equipped with a bull post in the center, and a stanchion and manger in one corner. The other half of the floor is divided into six box stalls for test cows.

All hay and grain is hoisted by a gasoline engine and double drum hoisting machine. The gasoline engine is located outside of the building, and is connected with the drums, which are located in the hay loft, by two leather belts. The drums are adjusted so that they will either hoist or lower the load, or will hold it stationary at any point.

Exercise shed. — The exercise shed is 37 feet by 44 feet. It is used in the winter when the ground is

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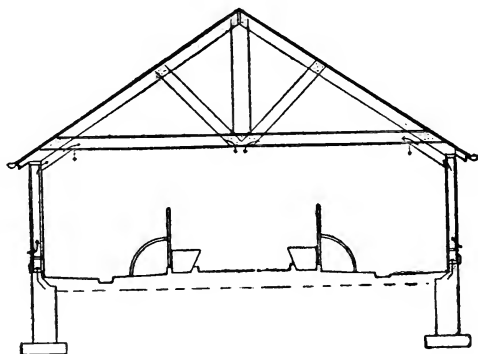
too slippery to turn the stock outside for exercise. It is well ventilated and has a large skylight in the roof. The floor is of dirt, so that it will be easy on the cows' and calves' feet. The breeding, and hoof trimming racks, as described in another chapter, are kept and used in this building. The manure trolleys from the main barns all lead to the exercise shed. The loaded carriers are stopped over trap doors in the floor, and the manure dumped into the manure spreaders that are backed in underneath the trap doors.

Silos. — There are three silos in use, built of hollow tile and finished on the outside with stucco. The first cost of tile silos is greater than that of wooden structures, but the cost of upkeep is considerably less. They are 36 by 12 feet, and the bottom of the silo is six feet below the ground level.

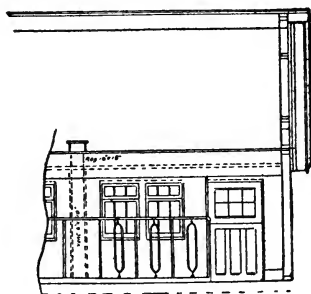
Maternity stalls. — The maternity stalls are located in a quiet room, separated from the other cows. The stalls are 8 by 10 feet. The walls or partitions are built of solid concrete 4 feet high. The solid walls are more satisfactory than the pipe partitions, because there is no danger of the calf being injured by getting its feet caught between the pipes during birth. It gives more seclusion, and the cows in the adjoining stalls are thus less apt to become excited.

Calf barn. — As soon as the calf is weaned it is placed in the small box stall in calf barn. When between three and four months old it is moved to the main calf barn. The calf barn is 30 ft. by 40 ft. and contains 20 calf stanchions. The

floors are of cement, the same as in the milking barn, and the stall platforms are of cork brick. The alleys back of the calves are 4 feet wide. The gutters are 12 inches wide and from four to five inches deep.



Cross Section of Calf Barn



Section of Calf Barn Showing Stanchions

The stall platforms are four feet long. The stall divisions are of iron pipe and similar to those used in the milking barn and are spaced two and one half feet apart. The mangers are made of cement, with the bottom sixteen inches wide and two inches

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higher than the level of the stall platforms. They are equipped with galvanized front and sides, as illustrated. The center feeding alley is 6 feet 4 inches wide.

The stanchions are adjustable, and can be regulated to five different widths, and can also be moved forward or back, according to the size of the calf. The ventilating is taken care of by the same system as is used in the milking barn.

The calves are removed from this barn when they have outgrown the calf stalls. They are then placed in the regulation cow stalls, in barn.

CHAPTER IX

DAIRY PRACTICE

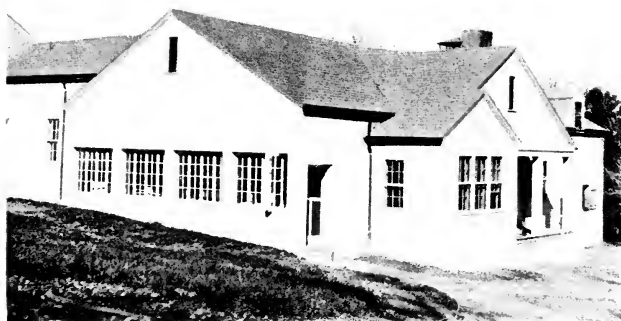
IN THE production and storage of clean milk, the following three thoughts or rules should be uppermost in the dairyman's mind at all times: *First*, do not allow the milk to come in contact with air any more than is absolutely necessary. *Second*, all utensils, machinery, containers, etc., with which milk must necessarily come in contact should be sterilized shortly before using. *Third*, immediately after milking, the milk should be clarified or strained, and cooled to a low temperature and kept cold until delivered. It does not require an elaborate plant or equipment to carry out the above rules, but it does require a sanitary plant and a certain amount of care and forethought. In a large dairy there are a number of efficient labor-saving devices that can be used and will pay for themselves in the time saved.

Exposing milk to the air is nothing more or less than exposing it to bacteria-laden dust. In the ordinary handling of milk some exposure is unavoidable, but the object should be to keep this exposure reduced to a minimum. Utensils that are not sterile are breeding places for bacteria and naturally contaminate milk that comes in contact with them. It is not enough to wash them with hot water, but they

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should be sterilized. These special precautions, then, are to prevent the contamination of the milk with bacteria, which are harmful in many ways. Certain bacteria will cause chemical changes in the composition of milk, giving it an unpleasant taste or odor; others are dangerous to the health of those drinking the milk, and still others will change the appearance of the milk by making it stringy or off color. It is possible by using certain precautions to keep the bacterial count in raw milk very low, but not absolutely nil. Milk drawn from the cow's udder is not entirely free from bacteria. The board of health requirements for certified milk usually require that the first stream from each cow be rejected. The reason for this is that it has been demonstrated that bacteria enter the udder through the openings in teat and greatly multiply and spread. The first milk drawn will contain a large proportion of bacteria and usually the last milk will contain a small amount. It has been found that a single hair from a cow's body will contain hundreds of thousands of bacteria.

Cold is unfavorable to the growth of bacteria and for this reason we cool the milk as soon as possible after drawing and store it at a low temperature. Certain bacteria if kept at a favorable temperature and under conditions otherwise favorable to their growth will multiply very rapidly. They multiply by splitting in halves, which usually occurs every half hour under the above conditions. At this rate one bacterium in twenty-four hours would become the ancestor of 280,000,000,000,000. Under conditions unfavorable for their multiplication, such as



DAIRY BUILDING

cold or intense heat, they are either killed or remain practically at a standstill, which shows the importance of immediate cooling and storing at a low temperature. The method of handling milk at Brookwood Farms is this:

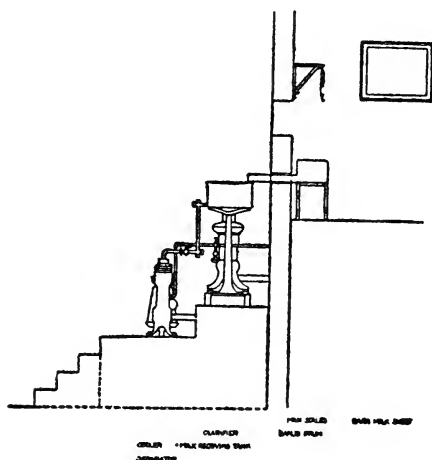
Care is taken to use clean bedding free from dust. The floors are sprinkled systematically. Orders are that no dusty feed or hay and no silage be brought into the barn until after milking. Ample provision is made for fresh air and good ventilation. The milkers must wear clean suits and have clean hands and employ proper methods of milking. Utensils must be sterile and a throat latch is used to keep the cows on their feet until after milking. The milk is weighed and poured into the banjo drum that connects with the receiving tank in the dairy. No amount of straining will make up for the carelessness of the milker. It may remove the coarse particles of dirt, but the next milk poured through will wash the bacteria off these particles and through to the receiving tanks.

The banjo drum is a zinc receptacle having a spout of sufficient length to reach from a frame in the milk receiving room to the milk receiving tank in dairy. The drum is not stationary, but rests on a frame, and the spout is thrust through a hole in the wall. The drum is removed to the wash room after each milking, where it is washed and sterilized, and is placed in position for receiving the milk immediately before the next milking.

From the milk receiving tank the milk takes either one of two courses. If whole milk is to be sold it is

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run immediately to the centrifugal milk clarifier, which is a turbine machine for clarifying milk. It revolves at a speed of 6,000 revolutions per minute; any slime or dirt remains in the bowl shell to be removed after the operation is completed, and the clarified milk passes out through a short pipe to the cooler. If the milk is to be shipped in bulk it is run from the cooler to 40-qt. cans. Each can is weighed



before and after being filled, and tagged ready for shipment; the net weight of milk in each can is marked on the tag, signed by the weigher and recorded in a shipping book. The lids are fastened to each can by a wire with a patent seal. These precautions are taken to avoid the possibility of claims of shortage due from any cause, which were many before this system was adopted and none

after. If the milk is to be delivered in bottles, the bottling machine is placed under the outlet leading from the cooler. The bottles are filled and capped in one operation and placed immediately in the refrigerator.

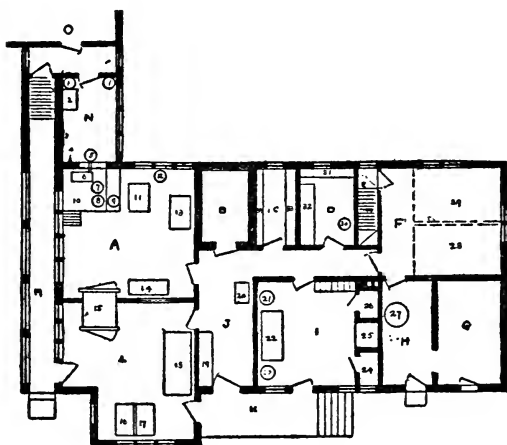
If butter or cream is to be made, the milk is run directly from the receiving tank to the centrifugal separator, the operation of which is so generally understood as to require no further explanation here, the cream running to the cooler and the skim milk to 40-qt. cans. All cream should be cooled immediately after separation to check the bacterial growth. It keeps better and longer, and has a better flavor than cream that is run into pails while warm and allowed to cool slowly in a refrigerator.

The cooler is connected with the refrigerating plant and cools milk and cream to a temperature of from 32 degrees to 36 degrees Fahrenheit. The surface of the cooler is corrugated, to increase the cooling surface over which the cream or milk has to flow. This surface should be protected from exposure to the air either by a glass or a metal covering. The cream is run from the cooler, either to bottles or to sterilized cans, and placed immediately in the refrigerator.

Before each milking or churning, the floors in the milk room are sprinkled by means of a hose, and the room is filled with steam which is allowed to settle, taking with it all particles of dust. The walls in the dairy (as well as the cow barns) are plastered and enameled. In the summer the windows of the milk room are screened with muslin, which is also a dust

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preventive. The arrangement of the different machines in this room is illustrated in diagram and shows the manner in which they are placed on differ-



Floor Plan of Dairy

- | | | |
|--------------------------|------------------------|--|
| A. Milk Room | 1. Water Supply | 18. Can Washer |
| B. Refrigerator | 2. Sink | 19. Shipping Desk |
| C. Store Room | 3. Barn Milk Sheet | 20. Scales |
| D. Laboratory | 4. Milk Scales | 21. Gas Engine |
| E. Stairs to Hotel Udder | 5. Banjo Drum | 22. Washing Machine |
| F. Machine Room | 6. Milk Receiving Tank | 23. Rinser |
| G. Coal Storage | 7. Clarifier | 24. Toilet |
| H. Boiler Room | 8. Separator | 25. Shower Bath |
| I. Laundry | 9. Cooler | 26. Steam Drying Closet |
| J. Hall | 10. Platform | 27. Boiler |
| K. Porch | 11. Pasteurizer | 28. Refrigerating Plant |
| L. Wash Room | 12. Starter Can | 29. Electric Generator |
| M. Passage to Cow Barn | 13. Butter Churn | 30. Babcock Tester |
| N. Milk Receiving Room | 14. Packing Table | 31. Slate Sink |
| O. Cow Barn | 15. Sterilizer | 32. Closet for Medicines
and Supplies |
| | 16. Bottle Washer | 33. Shelves |
| | 17. Washing Sink | |

ent levels, allowing the milk to pass from one machine to another by gravity.

The factors in securing and holding a good butter trade are flavor, body, salt, style, keeping qualities

and uniformity. We must realize that the best or highest grade of butter commands a premium on the market, and the extra cost of producing the highest grade is very little, depending mainly upon the ability of the butter-maker and the system and conditions under which it is manufactured. He should be very familiar with the detail scoring of the above factors and should also know the ideal requirements demanded by his customers.

Pasteurizing.—All cream that we make into butter is first pasteurized, and later a pure culture of lactic acid bacteria is added. This makes the butter more uniform by controlling the fermentation. It eliminates the undesirable taints, destroys the germs that affect quality as well as disease germs and greatly increases the keeping qualities. All cream for one churning should be of the same degree of ripeness, that is, two lots of cream that vary greatly in percentage of acidity should not be mixed. The richness of cream for different churnings should always be uniform. Our standard fat percentage is 35 per cent.

The cream is taken from the refrigerator, drawn into the pasteurizer and heated to a temperature of 165 degrees Fahrenheit and held at this temperature for fifteen minutes, the automatic agitator gently stirring the cream during this time. The cream is then rapidly cooled to a temperature of 40 degrees Fahrenheit and is now ready to be ripened, which is the souring or production of lactic acid in the cream and is affected by the inoculation of a pure culture of lactic acid bacteria.

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Preparation of commercial starter. — The object of this is to produce a desirable quality in the butter by controlling the bacteria which will produce the proper acidity, flavors, etc., and to exclude all undesirable bacteria. The desirable bacteria contained in the commercial culture are purchased from a bacteriological laboratory in small bottles that have been thoroughly tested and contain the germs in a virulent condition to produce the desired results, but before they can be added to pasteurized cream they must be multiplied or increased in amount, also propagated and kept pure in order to be useable for a number of ripenings from day to day. The starter is prepared in a special starter can that is connected with water and steam, and the temperature can be absolutely controlled. We prepare by placing two quarts of clean, sweet milk in the can, heat gradually to a temperature of 200 degrees Fahrenheit and hold for one hour, after which we allow the milk to cool gradually to 90 degrees Fahrenheit. Then we add the vial of pure culture of lactic acid bacteria and run the agitator long enough thoroughly to mix the starter and allow to cool gradually to 70 degrees Fahrenheit. This temperature is retained for from 18 to 24 hours or until the percentage of acidity reaches 0.7 per cent. Then we cool immediately to below 40 degrees Fahrenheit. The milk is then very carefully drawn from the starter can to a sterile glass jar which is placed in the refrigerator and held at a temperature of about 35 degrees Fahrenheit until ready for use. This completes the preparation of the mother starter. It is generally advised to pre-

pare the mother starter in two or three separate jars, so that if one is not successful the other can be used.

The second starter, or the one to be used in ripening the pasteurized cream, is prepared as follows: The starter can is again sterilized and skimmilk added, an amount equal to one-tenth of the amount of cream to be ripened, and heated to a temperature of 200 degrees Fahrenheit and held for one hour, then cooled to a temperature of 70 degrees Fahrenheit. The jar containing the mother starter is taken from the refrigerator and also heated to 70 degrees Fahrenheit and the contents added to the skimmilk in starter can and mixed thoroughly by the agitator. This temperature of 70 degrees is held for from 18 to 24 hours, or until by the acid test it shows a percentage of 0.7 per cent acidity, at which time it is ready to add to the pasteurized cream. The starter should be timed so that it is ready at about the same time that cream is ready for ripening. The prepared starter is then added to the cream in the ripening vat, with the exception of two quarts that are drawn carefully to quart jars and held in the refrigerator to propagate the starter for next cream ripening, which is prepared by heating the full amount of skimmilk to 200 degrees Fahrenheit as before and adding the mother starter saved from the previous ripening.

Ripening of cream. — Before adding the prepared starter, the cream is heated to a temperature of from 60 degrees to 70 degrees Fahrenheit, depending upon the outside temperature, and the agitator stopped after thoroughly mixing, but the cream should be stirred occasionally during the ripening process.

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After the ripening has proceeded for several hours, acid tests are made to determine the acidity, which should be about .58 per cent. This percentage is reached in from 10 to 12 hours. The cream is then cooled to 50 to 60 degrees Fahrenheit and immediately removed to the combination rotary drum churn and butter worker, first being run through a special strainer that is attached to the churn. This separates all lumps or coarse particles that may be in the cream and would otherwise get in the butter.

Churning.—The churn should be sterilized before cream is added. The best results are obtained when it is about one third full of cream.

We find that with Jersey cows, under ordinary feed and care, it is not necessary to color the butter by artificial methods, as it always contains a good, rich yellow color. Many creamerymen, especially those using milk from different herds, will use up to two ounces of commercially prepared coloring matter per 100 lbs. fat, which is added to the cream immediately after being poured in the churn.

The churn is then started and run continually at the proper speed until the granules are slightly smaller than a kernel of corn, the buttermilk has a bluish color and the butter floats well up in the buttermilk. This is determined by looking through a small glass window in one end of the churn. At this point the churn is stopped and the buttermilk is drawn off through an outlet in one corner. The butter is then washed thoroughly with pure water that has been heated to about the same temperature as the butter, depending upon the hardness of butter

at this time. The water we use is drawn under the most careful conditions from a pure mountain spring shortly before churning. It may be necessary to wash the butter two or three times to remove the buttermilk. Salt is then added in amount up to one ounce to the pound of butter, depending upon the market requirements. The weight of the butter in the churn is determined mathematically so that it is not necessary to remove and weigh. A moisture test is also made before adding the salt to determine if there is enough moisture present to dissolve the required amount of salt.

After the salt is added the workers are put in gear and worked a few revolutions, and then allowed to stand for several minutes to allow the salt to dissolve. They are then worked for several revolutions more, so that the salt will be evenly distributed and the excess buttermilk and water worked out. The butter is then removed and printed into one-pound prints, which bear the name of the farm, are wrapped in parchment paper and finally placed in one-pound cartons ready for delivery.

Care of the churn. — After the butter is removed the churn is cleaned as follows: First, add one-third full of warm water and revolve churn several times, then drain off and add scalding hot water and revolve several times more, thoroughly drain the water off while still hot and the churn will dry very quickly. At least once a week it should be washed with lime-water, which can be prepared as follows: Place 3 lbs. of unslacked lime in the bottom of a five-gallon jar, add one gallon of water, and when

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the lime is slacked fill the can with water and stir vigorously, allow to settle and use the clear water.

Cottage cheese. — When selling cream or making butter, the by-product or skimmilk is either used for feeding pigs or is made into cheese. There seems to be an exceptional demand for cottage cheese at this time, as the government and state experimental



*An Attractive Feature that Gives Individuality to the Dairy
Produced Cheese*

stations have been educating the public to its real value as a food, and say that one pound of this cheese is equivalent to from 1 to $1\frac{1}{2}$ lbs. of lean meat. One hundred pounds of skimmilk will make about 9 lbs. of cottage cheese, and retailed at 20 cents a pound is profitable to the dairyman as well as economical for the consumer, as compared with the price of meats. We pack our cheese in attractive one-pound water-proof cartons with printed covers. Our methods of manufacture are as follows: Skimmilk for cheese making

should be produced and stored under the same conditions as whole milk, and should be fresh. It is ripened with a special commercial starter that can be secured from any reliable dairy supply company. To prepare the mother starter, the skimmilk should be first pasteurized. The small bottle of commercial starter is added to one pint of this pasteurized skimmilk, carefully covered and kept at a temperature of 70 degrees to 80 degrees Fahrenheit until curdled. A teaspoonful of this mother starter is then added to a quart of pasteurized skimmilk and allowed to curdle. This is used for ripening the skimmilk (which has been pasteurized and cooled to 75 degrees Fahrenheit) by adding one pint to 30 lbs. of milk. It requires from 12 to 15 hours after the starter has been added before curdling takes place. The curd is then cut into small pieces to help the removal of whey, and then heated to a temperature of 100 degrees Fahrenheit for a half hour, gently stirring occasionally. It is then poured in a prepared cheese-cloth sack and allowed to drain for from one-half to one hour; then poured in large pans and salt added, about $2\frac{1}{2}$ oz. to 10 lbs. of cheese, and if required a small amount of cream can be added. The salt and cream are thoroughly worked in with a fork and finally packed in one-pound cartons.

Plan of dairy.—The sterilizer is built in the wall between the milk room and wash room, with an opening in each room. All equipment containers, parts of machines, etc., must enter the milk room through the sterilizer. Immediately before each milking this equipment is sterilized by high pressure

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steam and kept at a temperature of 220 degrees Fahrenheit for one-half hour, and then placed in position to receive the milk.

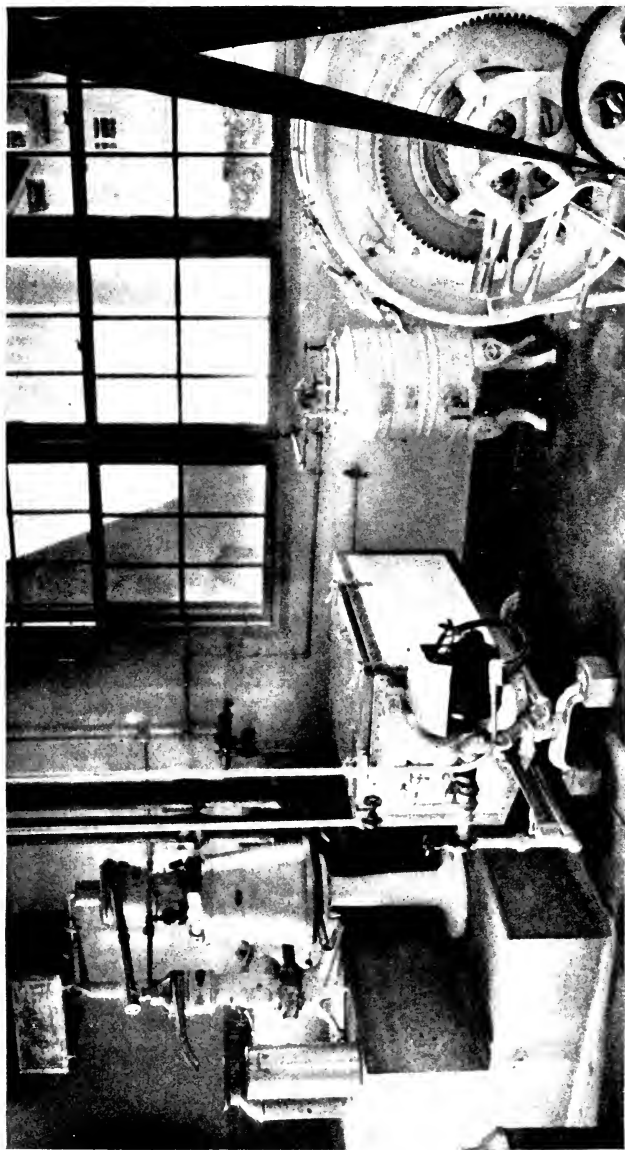
Wash room. — This room contains a large sink for washing parts of the separator, clarifier and small equipment; also a bottle washer and can washer, and each is connected with hot and cold water and steam.

Laundry. — The laundry is equipped with a washer and wringer, both being operated by a gas engine, also a steam drying closet for rapid drying and sterilizing. This plant is operated daily to wash and sterilize the suits worn by cow barn and dairy hands, also cloths, towels, bedding, etc.

Boiler room. — The boiler heats the entire cow barn and dairy in winter, furnishes live steam for sterilizing and runs the turbine machines. The engineer in charge of the boiler and machine rooms must have passed a satisfactory examination before being employed. There is a maximum amount of coal allowed for the use of the boiler, and each morning the portion for the day's use is weighed out in cans.

Machine room. — The electric and refrigerating engines are located in this room, both being operated by gas engines. The electric machine runs automatically and furnishes light for all of the farm buildings and office. When the batteries get below a certain voltage the engine starts and runs automatically until the batteries are fully charged and then stops. The engineer keeps it supplied with gas, oil and water and keeps it clean and in repair.

The cooling plant is a mechanical ammonia com-



A CORNER OF THE MILK ROOM

pression refrigerating system. Cold is transferred by the brine system. After the first cost of installing this plant, it can be operated as economically as the natural ice system and is much more convenient.

Laboratory. — The laboratory is equipped with a 24-bottle turbine Babcock tester, moisture and acid tests, etc.; a closet for all necessary medicines and veterinary supplies, also a large slate sink and drain board, hot and cold water and steam connections.

Stock room. — The stock room contains a stock of all necessary supplies for the cow barn and dairy. Nothing is removed from this room without an order from the office, and an accurate account is kept of everything that goes in or out.

Refrigerator. — The refrigerator temperature is controlled by the refrigerating plant in the machine room, and is kept at a temperature of from 32 degrees to 36 degrees Fahrenheit at all times.

Marketing dairy products. — All that is gained by the result of efficient methods to produce economically may be lost if the same careful system is not used to dispose of these products. A farmer may be selling whole milk where he could sell cream or butter and net larger returns. To determine the most profitable outlet he should base his selling price of the other products by what he can get for whole milk. That is, if he sells milk for 12 cents a quart, he should net this amount per quart, plus the extra cost of labor if it is converted into butter, cream or cheese.

The chart illustrates how the comparative values of the different products can be determined.

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100 POUNDS OR 46.511 QUARTS OF MILK

Per cent of fat in milk	Per cent of fat in cream	Equivalent amount of cream per 109 lbs. milk		Equiv. amount of butter per 100 lbs. milk
		lbs.	qts.	lbs.
3½	20	17½	8.274	4.095
3½	25	14	6.666	4.095
3½	30	11½	5.587	4.095
3½	35	10	4.8	4.095
3½	40	8¾	4.257	4.095
3½	45	7⅞	3.7	4.095
3½	50	7	3.451	4.095
4	20	20	9.456	4.68
4	25	16	7.619	4.68
4	30	13½	6.349	4.68
4	35	11⅞	5.3	4.68
4	40	10	4.866	4.68
4	45	8⅞	4.3	4.68
4	50	8	3.944	4.68
4½	20	22½	10.638	5.265
4½	25	18	8.571	5.265
4½	30	15	7.183	5.265
4½	35	12⅞	6.2	5.265
4½	40	11½	5.474	5.265
4½	45	10	4.9	5.265
4½	50	9	4.437	5.265
5	20	25	11.820	5.85
5	25	20	9.523	5.85
5	30	16⅞	7.981	5.85
5	35	14⅞	6.8	5.85
5	40	12½	6.082	5.85
5	45	11⅞	5.4	5.85
5	50	10	4.930	5.85
5½	20	27.5	13.002	6.435
5½	25	22	10.476	6.435
5½	30	18½	8.780	6.435
5½	35	15⅞	7.5	6.435
5½	40	13¾	6.691	6.435
5½	45	12⅞	5.9	6.435
5½	50	11	5.424	6.435

As an example of the use of the chart, suppose that we are producing $3\frac{1}{2}$ per cent milk; according to the chart 100 lbs. milk is equal to 46.511 quarts. If we retail this at 12 cents per quart, we will realize \$5.58. If we convert the milk to 20 per cent cream, we will have $17\frac{1}{2}$ lbs., or 8.274 quarts of cream, and selling this at 80 cents a quart we would realize \$6.61. If we sell butter we find that 100 lbs. $3\frac{1}{2}$ per cent milk will make 4.095 lbs., which if sold at 80 cents a pound would realize \$3.27.

DAIRY RULES

I

All dairy utensils to be sterilized before each run for one-half hour at 5 lbs. pressure and temperature of 218 degrees.

All machines to be ready to handle milk when it is delivered to receiving tank.

Line shaft and machinery to be cared for by employes in their different rooms.

Refrigerating plant to be run from 10 A.M. to 4 P.M. daily.

Employes on each shift to clean and oil machines, scrub floors, clean brass, wood-work, windows and all other work pertaining to that department.

Stock-room to be kept locked and all supplies checked when taken out.

All sales to be recorded on ticket machine.

No bottles or milk-pails to be given out unless charged to parties taking them.

Employes to wear clean uniforms at all times.

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Any breakage due to neglect or carelessness to be charged to the person responsible.

No one allowed in refrigerator unless absolutely necessary to take in or out dairy products — door to be always locked.

Employes not working in dairy to be admitted to dairy hall only.

Report any irregularities or any unusual conditions.

See rules for machines and boiler rooms, also labor and work schedules.

II

Washing utensils. — Have sink half full of water, hot enough so that you can bear your hands in it. Add one-half handful of dairy cleanser; wash utensils with brush; when finished, draw off water, fill sink same as before only without any powder, wash thoroughly again and scald; when finished put in sterilizer.

Bottles. — Fill sink with water, add one-half handful of soda, fill bottles half full of water when putting on brush to wash. Hold steam at 5 lbs; after washing, rinse in second sink and put in rack while still hot, and steam gradually so as not to break any bottles.

Can washer. — Fill sink with water and apply steam until water is quite warm, add handful of dairy cleanser. Start gasoline engine and thoroughly wash cans inside and out with brush, and rinse. Sterilize on can table.

Pasteurizer. — Fill with cold water, turn on steam,

add half handful chipped soap made in solution. Heat quite warm and thoroughly cleanse. Remove water and cleanse again with hot water; scald before using.

Churn. — First add one-third full of warm water and revolve several minutes, drain water off and add scalding hot water and revolve several times more; thoroughly drain the water off while still hot and the churn will dry very quickly. At least once each week the churn should be washed with lime water.

Separator and clarifier. — Warm water should be added before turning on milk. Operate at sixty revolutions per minute on speed indicator. Cream should test about 35 per cent fat. Skim milk from three to five one hundredths of one per cent fat.

Laundry instructions. — Soap formula: Five pounds soap, $1\frac{1}{2}$ lbs. soda.) First cook soap until dissolved, then add soda that has been dissolved in warm water. If common washing soda is used, use one pound of soap. This should make ten gallons of liquid soap when finished. Add enough of this liquid to form lively suds in machine.

Washing formula. — Fill machine half full of water, run five minutes, then discharge. Suds should be heated to about 180 to 200 degrees. Rinse in usual way; at least one good hot rinse should follow suds in order not to chill soap in goods. Should a soap speck form on goods, boil clothes in a soda bath, which will remove all trace of the little specks. Do not use too much water in washing; it is all right to have plenty of water for rinsing. Goods will not wash well unless they can drop.

CHAPTER X

OFFICIAL TESTING

“Historical. The Babcock test, now in universal use as a quick, easy, and accurate method of determining the percentage of fat in milk, was invented in 1890 by Dr. S. M. Babcock, chemist of the Wisconsin Agricultural Experiment Station. Up to that time no easy means of determining the percentage of fat in milk was in existence, and there was no easy, reliable method of determining the productive capacity of individual cows, although something had been done by churning butter from the milk of individual cows. As early as 1875 the breeders of dairy cattle recognized the importance of determining the productive capacity of each individual animal as a basis of selection looking toward the improvement of the breeds. The dairy demonstration at the World’s Columbian Exposition at Chicago in 1893 fully established the merits of the Babcock test, and also demonstrated to the satisfaction of the dairy public the fact that the amount of fat in the milk is an accurate measure of the amount of butter that may be churned from it.

“The supervision of records — “official test,” as it is ordinarily called — is now undertaken by the agricultural colleges and experiment stations in all the



BEECHLANDS CHAMPION LILY
291452 A.J.C.C

EDWIN MEGATGEE

(First Prize for R. of M. cow at Indianapolis, and Southwestern Dairy Show at Kansas City. Record of 14,355.6 lbs. milk and 829.26 lbs. fat at 11 years and 6 months of age)



states in which dairy cattle are bred and developed. The breeders' associations of the Holstein, Jersey, Guernsey, Ayrshire, Short Horn and Brown-Swiss breeds have established departments in their herd books in which animals are entered that have reached a certain established standard of production. These departments are variously known as advanced registry, register of merit, semi-official records and the like. The work of supervising records is recognized by the National Dairy Science Association, and for several years a standing committee of this association — The Committee on Relations with Breed Associations — has been maintained. At a conference of this committee held on June 28 and 29, 1914, at which representatives of official testing in about twelve states were present, the following rules were recommended to be followed in supervising official tests.”¹

RULES FOR THE SUPERVISION OF OFFICIAL TESTS

Recommended by the Official Dairy Science Association

1. The supervisor shall be present at the last regular milking preceding the beginning of the test and shall see that the cow is milked dry. He shall note the hour that this milking is made and the last milking of the test shall be made at the same hour.

2. He must be present at every milking during the test and see that the pail contains nothing but the milk drawn from the cow under test.

¹ From Extension Circular No. 5, N. Y. State College of Agriculture, Ithaca, N.Y., by Henry H. Wing.

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3. Only one cow shall be milked at a time, and the supervisor must in every case be in a position to observe the milker during the whole milking.

4. Immediately after the milk is drawn at each milking he shall take charge of the pail and contents, weigh the same on scales provided by the station, and enter the exact weight of the milk at once on his records.

5. An extra pail shall be provided by the owner, and the milk shall be poured from one pail to another until thoroughly mixed. The supervisor shall then take correct samples of the milk sufficient for his test and for the composite sample.

6. The samples of milk shall be kept under lock and key, or in the supervisor's sight until tested.

7. The fat determination shall always be made in duplicate, using properly calibrated glassware, and both determinations recorded. The average must be used in computing the amount of fat. The samples taken at any one milking shall not be thrown away until satisfactory duplicate tests of the milking are obtained.

8. Reading of the tests shall be made at a temperature of 130° to 140°. If the duplicate determinations vary more than .2 per cent, the test must be repeated.

9. A composite sample for each cow correctly made and preserved shall be forwarded to the station immediately upon completion of a two-day or seven-day test: and in the case of tests for longer periods, at intervals not to exceed ten days. In case of two-day tests this composite shall contain 3 cc. of milk

for each pound of milk produced during the test, and in case of tests for a longer time 1 cc. for each pound of milk produced during the test. Suitable containers for such composite samples shall be furnished by the owners of the cow on test.

10. In case all or part of the milk of any milking shall be accidentally lost, the average of the six nearest milkings at the same hour shall be interpolated. It must be stated that such data are estimated. This rule shall apply only in the case of tests seven days or more in length.

11. The supervisor shall report to the person in charge of testing in the State any obvious violations of the rules of the breed association on the part of owner or attendants.

CHAPTER XI

THE AYRSHIRE BREED¹

THE County of Ayr, in which the Ayrshire breed of cattle originated, is situated in the south-west of Scotland, backed by mountains on the east and washed by the ocean on the west, having the form of a crescent and embracing the Firth of Clyde in its circle. The face of the country is hilly, and rises from the level of the sea some 2000 feet to the top of the mountains on the east. The soil is strong and somewhat heavy, being a clay and clay-loam, but thinner on the tops of the hills and mountains, the whole being originally covered with a dense growth of timber. The climate is moist, with a temperature ranging from about twenty-five to sixty-five degrees, with a mean temperature of about forty-seven degrees, regulated by its proximity to the sea, and with frequent rains, which are favorable to growth of grass, giving luxuriant pasturage, though sometimes the country is swept by fierce coast storms.

The Ayrshire is probably the youngest of the thoroughbred dairy breeds, and though her origin is veiled in some obscurity there are many things that

¹ Furnished by Mr. J. E. Watson, Secretary, Ayrshire Breeders' Association, Brandon, Vt.

confirm the theory that the native wild cattle of the country are the foundation of the Ayrshire of modern times. The original native wild cattle of the country were said to be white, with red ears and black noses, high white horns with black tips, with an animal now and then having more of the brown, black or red; they were very wild, and the bulls fierce, but when calves were taken young they grew to be quiet and tame. This theory seems the more reasonable when we consider how easily the Ayrshire color reverts to the white; then too there is frequently an Ayrshire that has a strong tendency to that wild, alert bearing that characterized the foundation stock.

The first we hear of any effort being made to improve the native stock of the country was about the year 1700, and this was said to have been accomplished by selection and better care.

We read from Aiton that about 1750 the Earl of Marchmont purchased from the Bishop of Durham, and carried to his seat in Berwickshire, several cows and a bull of the Teeswater or other English breed, of a brown and white color. He also writes that about 1770, bulls and cows of the Teeswater or Shorthorn breed were said to have been introduced by several proprietors, and it is from them and their crosses with the native stock that the present dairy breed has been formed.

In 1811, in "Survey of Ayrshire," Aiton writes that the Ayrshire dairy breed is in a great measure the native indigenous breed of the County of Ayr, improved in their size, shapes and qualities, chiefly

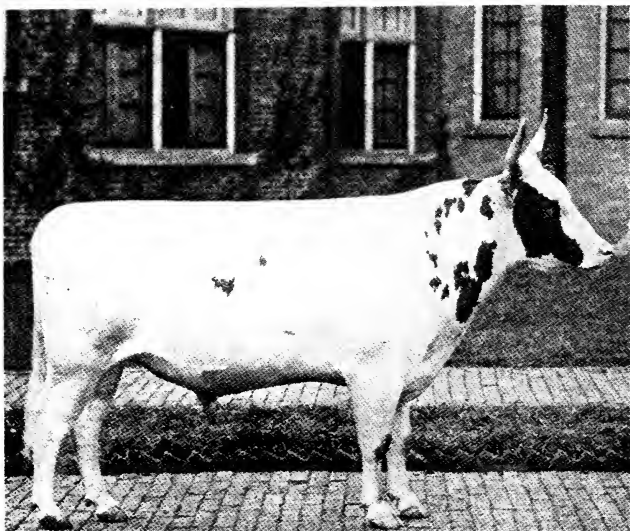
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by judicious selection, cross coupling, feeding and treatment for a long series of time and with much judgment and attention.

From about the beginning of the last century we find frequent mention of efforts for improvement in the shape of body, and especially in the shape of the udder.

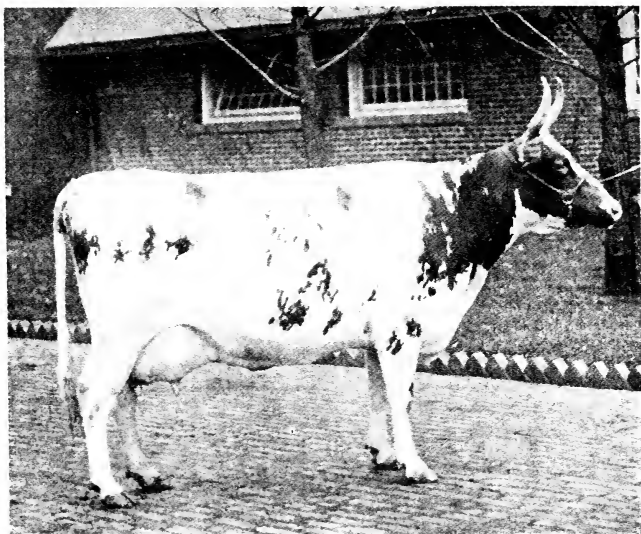
Ayrshires were very early brought into Canada by the Scotch settlers, also were brought over on ships from Glasgow to supply milk during the voyage, and were sold on arrival at Montreal or Quebec, and so popular were these cows that shipmasters were commissioned to bring over one or more cows from Ayrshire. More recently Ayrshires have been imported into Canada in large numbers. The importation to the United States began about 1837, by the Massachusetts Society for Promotion of Agriculture bringing a few head into the state and scattering them among the farmers of Massachusetts. Other importations from Scotland followed at intervals into different parts of the United States, as the value of this breed for dairy purposes was made evident, and the demand greater than the home breeders could supply.

The Ayrshire cow in general is a handsome, sprightly looking cow of medium size, weighing at maturity from about 1,000 pounds to 1,200, sometimes going as high as 1,400 or 1,500, red and white in color, the relative proportions of red and white being greatly varied and readily yielding to the taste of the breeder, from his skill in selecting breeding animals.



HOBSLAND PERFECT PIECE, 10665 Imp.

Undeafated champion of Scotland and America. Owned
by Strathglass Farm, Port Chester, N. Y.



KILNFORD BELL. 3d; 30643, Imp.

Winner of the Valentine \$500 Silver Trophy as the best cow
of any dairy breed. National Dairy Show, 1913. Owned
by Adam Seitz, Waukesha, Wis.

There has of late seemed to be more inquiry for Ayrshires with white preponderating, but color is merely a matter of fancy and carries with it no excellence of dairy quality.

The Ayrshire has a small, bony head, large, full eyes, dish face, broad muzzle, large mouth, upright horns, the size, whether slim or large, being a matter of local taste in breeding, long, slim neck, clean cut at throat, thin sloping shoulders, with the spine rising a little above the shoulder blades, back level to setting on of tail, except a rise at the pelvic arch, broad across the loin, barrel deep and large, with ribs well sprung to give abundant room for storing coarse fodder, and wide through the region of the heart and lungs. Hips wide apart, rump long, hind legs straight, thighs thin and in-curving, giving room for udder, legs short, bones small, joints firm, udder large and square, and on young cows it is nearly level with belly, wide, long and strongly hung teats, from two and a half to three and a half inches long, of good size, placed wide apart on the four corners of the udder, with udder level between the teats and not cut up, milk veins large and tortuous, entering the belly well forward towards the fore legs. Skin soft and mellow, covered with a thick growth of fine hair.

While an Ayrshire cow should be shapely and handsome to look at as she stands or walks, she should when handled reveal much looseness of vertebra, flatness of rib, and width between the ribs, indicating large dairy capacity. The Ayrshire is a tough, hardy cow, with a vigorous appetite, and not

too particular what she eats. She is always hungry, eats greedily, and chews her cud rapidly. You can rarely see an Ayrshire cow when not either taking in food or chewing what she has already gathered. While at pasture she does not wander around looking for sweet patches of grass, but goes to work rapidly gathering what is most convenient, either of grass or browse, and when full lies down to chew her cud with no time wasted, and when going to and from pasture will chew her cud while walking, and often continues to chew when started into a run.

The general appearance of an Ayrshire, as you look at her, is striking; she is alert and full of life and reserve energy. She is a healthy cow, rarely having ailments of body or udder, and you seldom see an Ayrshire cow but has four healthy quarters in her udder and gives a uniform quantity of milk from each. She is a very persistent milker, giving a uniform quantity well up towards calving, and is in many cases dried off only with difficulty.

She is very intelligent, quick to learn and of a retentive memory, easily taught to take the same place in the stable and, if required to change, will in a few days readily take the new place. She is quiet and pleasant to milk, not easily disturbed, and will as a rule yield her milk as readily to one milker as to another, and does not seem disturbed by any amount of noise in the stable.

As a dairy cow she is particularly adapted to the production of milk for the milkman and for table use, as her medium size, vigorous appetite and easy

keeping qualities make her an economical producer, while her even, uniform production makes her a reliable supply, and the richness of her milk in total solids places it above suspicion from city milk inspectors. Her milk is particularly adapted to transportation, as it does not churn or sour easily. The milk and cream mix readily on pouring back and forth two or three times, and once so mixed, will remain mixed for a long time, so that a uniform quality is maintained until the last portion is sold or used. It has a good body, is rich looking and never looks blue. The milk itself being evenly balanced with casein and butter fat is a complete food, easily digested, nutritious, and is particularly adapted to children and invalids. Stomachs that are weak and unable to digest other milk find no trouble with Ayrshire cows' milk.

Until recently in Scotland, Canada and the United States, the effort of breeders of Ayrshire cattle has been directed towards a uniformly high standard of dairy production from the breed as a whole, little attention being paid to developing the individual superiority of the breed in her dairy yield. This quality of the Ayrshire, the result of the general breeding, was particularly noticeable at the Pan American Exhibition in the comparative dairy yield of the Ayrshire with that of other dairy breeds. That test showed the least margin of difference between the highest and lowest dairy yield in the Ayrshire of any of the breeds, showing a uniformly high class of cows, none phenomenally good and none particularly poor, but with remarkably uniform yields.

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In 1902 the Ayrshire Breeders' Association inaugurated the advanced registry testing, under the supervision of the Experiment Station in the State where the herd being tested was located.

Later the Canadian Government established a system of testing Ayrshire cows for advanced registry, and the Scotch breeders followed with a society for keeping records of the dairy production of their cows.

It is the belief of the Ayrshire Breeders' Association that while daily, weekly and monthly tests are interesting in a way, they are misleading as to the real value of a cow, and the desire of the Association is to produce and make public the real profit derived from the cow in her normal condition, doing her regular dairy work of a breeding and dairy cow. A cow must be kept the whole year at an expense, and whether or not she is a paying investment depends upon the receipts from her for the full time she is kept. She might be forced to a phenomenal yield for a week or a month, which if taken as the guide for the whole year would make her a very profitable cow, when, in reality, the short time yields were no guide at all for the whole time, and no index as to the dairy profit received from the cow.

The beginning of the advanced registry work was by the common dairyman, and no extra food and care was given beyond what any thrifty dairyman would find profitable in the management of his farm.

The cows were milked twice daily and driven to pasture and kept in the ordinary manner of dairy-men in general.

While this management was not conducive to large

yields, it showed a dairy ability that attracted attention, and indicated that skillful management and good care and feed might show the Ayrshire cow to be a profitable cow, and one worth looking after.

Now and then a cow under this management would make an official record of some ten thousand pounds of milk and over, and some four hundred pounds of butter, which attracted the attention of men of wealth and they bought Ayrshire cows and placed them in the hands of skilled feeders, and from that time the progress of the Ayrshire cow has been steady and rapid.

The first Ayrshire cow to make an official Ayrshire World Champion record was Rena Myrtle in 1901, a cow bred by C. M. Winslow, Brandon, Vt., and sold to the Vermont Experiment Station and tested by them as an experimental cow on different feeds, a short time on each, to find out which was the most profitable.

Even with this method which was not conducive to the best results, she made an official record for a year of 12,172 lbs. of milk, 468 lbs. of butter fat, that is to say 3.84% fat content.

The work of the Association in advanced registry testing has brought the Ayrshire cow before the public as nothing else would have done.

In the early days it was known that she was a profitable cow for the common dairyman who had scanty food for his cows, and had to depend on them for his support, and to pay off the mortgage on his farm. He knew his Ayrshire would return a profit for the food consumed, and would do well on any

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kind of pasture, and thrive on any kind of fodder and she got the name of being the poor man's cow, and the dairy rustler, but after the advanced registry work became better known and better understood, she attracted the attention of men of means who adopted measures to see what was in the Ayrshire cow, and to develop her dairy ability, both as a producer in quantity and quality, and we began to hear of more and more wonderful records.

There is nothing the Ayrshire Breeders have ever done that has brought such results as the advanced registry work.

It has shown that the Ayrshire cow has not had the half told of her dairy ability, that when put to the test her strong constitution will carry her through a year's test with no injury either to her health or breeding ability. It has developed in her a wonderful ability to increase her powers of handling food in large quantity and returning a correspondingly increased dairy yield.

It has brought to light the cows that have made phenomenal yields, and has also shown what bulls have the prepotency in themselves to raise the dairy yield of their offspring.

It has shown that the Ayrshire cow will pay the highest profit for food consumed, both when kept on scant allowance, and also when pushed to the full extent of her powers of assimilating food.

She pays a profit wherever she is, and under whatever conditions of care and management she may find herself.

THE FOLLOWING IS A LIST OF COWS THAT ARE BY OFFICIAL TEST THE CHAMPIONS OF THE BREED FOR EACH OF THE SEVERAL CLASSES

Class		Lbs. Milk	Lbs. Fat	% Fat
Mature.....	Garclaugh May Mischief..... Owned by Penshurst Farm	25329	894.91	3.53
Mature.....	Lily of Willowmoor (<i>Leader in fat production</i>) Owned by J. W. Clise	22596	955.56	4.23
Senior 4-year..	August Lassie	17784	720.03	4.05
	Owned by L. A. Reymann Estate			
Junior 4-year	Agnes Wallace of Maple Grove	17657	821.45	4.65
	Owned by M. G. Welch & Son			
Senior 3-year..	Jean Armour 3d	21938	859.65	3.92
	Owned by W. P. Schanck			
Junior 3-year	Ethel of South Farm.....	15056	589.20	3.91
	Owned by John Sherwin			
Senior 2-year..	Henderson's Dairy Gem	17974	738.32	4.11
	Owned by Henderson Ayrshire Farm			
Junior 2-year	Willowmoor Etta 3d.....	16621	666.06	4.10
	Owned by J. W. Clise			

ADVANCED REGISTRY

History. — Advanced Registry testing by the different dairy breeds has undoubtedly advanced the interests of pure-bred dairy cattle more than any other single factor.

To accomplish this, Advanced Registry has attained the following results:

It has brought the good cow out of the common herd and given to the public some actual knowledge of the real value of a good dairy cow.

It has killed the scrub cow, be she registered or unregistered, with the thinking dairyman. It has put the dairy interests upon a sound business basis and interested capital.

It has led men of culture and means to study the relation of good dairy cattle to the material growth of the country.

It has led to the investment of large sums of money in pure-bred stock, equipment for their care, and in promoting the dairy interests in general.

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It has brought capital and labor together in the dairy business.

It has demonstrated the dairy merits of the Ayrshires. It has proven the breed capable of developing the 25,000 pound milk cow and the 1100 pound butter cow. It has shown that the average production of both milk and butter-fat places her in the foremost rank as a profitable dairy cow, the average production of all completed records being 9503 lbs. of milk, 379.70 lbs. of fat, with an average test of 4% butter-fat.

ADVANCED REGISTRY AS A FACTOR IN THE DEVELOPMENT OF THE BREED

As Advanced Registry is based upon the proven individual merit of the animal as measured, on the part of the cow, by her ability in dairy production, and on the part of the bull by his potency in the production of creditable daughters, it is first aid to development within the breed.

It enables the breeder to ascertain the true dairy ability of his cows to his own satisfaction and to that of his customers as well, thereby increasing financially the value of his herd and their offspring. By a careful study of these records it enables the owner of common, grade or registered cows to select a bull with heredity such as is most likely, when mated to his cows, to increase the productive capacity of his herd.

Advanced Registry testing tends to make a better and more careful feeder, to increase the productive capacity of his entire herd, and when properly done

develops the cow's capacity, increases her value as a producer for succeeding lactations, and the productive capacity of her offspring.

Every good Advanced Registry record made raises the standard of the breed, increases its popularity and enhances the value of each individual within the breed. Advanced Registry testing is going to more firmly develop and fix those qualities in the Ayrshires which we believe are unsurpassed by any dairy breed — namely, best individuality, greatest uniformity, more attractive appearance, best lines, best shaped udders, and largest average production under normal conditions.

Production with type should be the aim of every breeder.

RULES FOR ADVANCED REGISTRY

PRELUDE

For the purpose of encouraging a better system of keeping milk and butter records, and that we may obtain more reliable records of the dairy yield of Ayrshire cows, we hereby adopt the following rules and regulations for the establishment of a system of Advanced Registry for Ayrshire cattle:

RULE I

The Secretary of the Association shall have charge of the registry under the general supervision and direction of the Executive Committee, shall prepare and publish blank forms and circulars needed in carrying this system into effect, receive and attend

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to all applications for this registry, and have general oversight and direction of all official tests of all milk and butter productions for it, and perform such other duties as may be required to secure the efficiency and success of this system. He shall make a full report of his work in this branch at the annual meeting each year, and publish the entries when so ordered by the Executive Committee.

RULE II

APPLICATION FOR TESTS

An application for a test will not be accepted from a person who is not a member of the Ayrshire Breeders' Association. Applications for intended tests should be made to the Secretary as long as possible before the desired time for beginning such tests in order to allow sufficient time to arrange with the Experiment Station of the State where the owner is located for supervision of the test.

In making application for a test, the owner should give sufficient evidence of the capability of the cow to qualify to warrant making the test.

A signed application for test, accompanied by the fee, as noted in Rule XI, must be filed with the Secretary of the Association within 30 days of the beginning of test.

RULE III

All tests shall be for a lactation period of not to exceed 365 consecutive days.

RULE IV

DETERMINATION OF AGE

With the change in requirements in effect March 1, 1918, the determination of age at the beginning of test shall be figured as a simple interest problem:

$$\begin{array}{r}
 1918-11-29 \\
 1914-5-15 \\
 \hline
 4 \quad 6 \quad 14
 \end{array}$$

Age:—4 yrs. 6 mo. 14 days or reduced to years and days is 4 yrs. 197 days, making the animal a senior four year old.

Requirements

Milk:

S 4 yr.—8500 lbs.

Fat:

4 yrs.—323.5 lbs.

197 day—19.7 lbs.

 Total...343.2 lbs.

The minimum requirements to qualify for the Advanced Registry as established in Rule VII would then be computed as follows: The milk requirement of all senior four-year-olds is 8500 pounds. The fat requirement is 323.5 lbs. for a cow starting on test at just 4 years of age and .1 for each additional day, or 19.7 lbs. for 197 days, a total of 343.2 pounds fat.

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RULE V

CLASSIFICATION OF ANIMALS

Cows from two years to two years and six months old shall be in a class known as the junior two year old form.

Cows from two years and six months (183 days) old to three years old shall be in a class known as the senior two-year-old form.

Cows from three years to three years and six months old shall be in a class known as the junior three-year-old form.

Cows from three years and six months (183 days) old to five years shall be in a class known as the senior three-year-old form.

Cows from four years to four years and six months old shall be in a class known as the junior four year old form.

Cows from four years and six months (183 days) old to five years shall be in a class known as the senior four-year-old form.

Cows five years old and over shall be in a class known as the mature form.

RULE VI

ELIGIBILITY OF BULLS

No bull shall be admitted to Advanced Registry unless he shall have been previously recorded in the Ayrshire Record.

A bull may be admitted to Advanced Registry

provided he has four daughters in the Advanced Registry from different dams.

RULE VII

ELIGIBILITY OF COWS

Requirements in Separate Classes to qualify for the Advanced Registry.

No cow shall be admitted to Advanced Registry unless she shall have been previously recorded in the Ayrshire record. If the record is commenced the day the animal is two years old or previous to that day, she must produce within one year from that date 250.5 pounds of butter fat. For each day the animal is over two years old at the beginning of her year's record, the amount of butter fat she will be required to produce in the year will be established by adding .1 of a pound for each day to the 250.5 pounds required when two years old. This ratio is applicable until the animal is five years old, when the required amount will have reached 360 pounds, which will be the amount required of all cows five years old or over.

In addition to the above butter fat requirement, the animal shall produce the following amount of milk for the several classes:

Junior 2 yr. old.....	6000 lbs. milk
Senior 2 yr. old.....	6500 " "
Junior 3 yr. old.....	7000 " "
Senior 3 yr. old.....	7500 " "
Junior 4 yr. old.....	8000 " "
Senior 4 yr. old.....	8500 " "
Mature (5 yr. old and over).	9000 " "

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RULE VIII

PERIOD FOR MAKING TESTS

All tests shall be commenced as soon after calving as practicable, and shall not extend beyond 365 days from the commencement of the test, and in no case shall the test include the milk or butter fat from a second calving.

A cow may be entitled to as many registrations as her several tests qualify her for, even if they do not exceed previous records; also she may be entitled to a cumulative record of consecutive tests that qualify with an average of not more than fifteen months intervening between freshening.

ROLL OF HONOR

300 Days' Production with a Living Calf Carried 180 Days of Test

For the purpose of establishing a higher standard of excellence within the Advanced Registry which shall combine production of offspring with that of milk and butter fat, there is hereby created an Advanced Registry Roll of Honor.

(a) Any cow to be eligible to the Roll of Honor must conform to all requirements for her class in Advanced Registry in a period of 300 days from and after the day of entry, instead of one year, and in addition she must produce a living calf which she has carried for at least 180 days during the period of her test. Records of service to be furnished on monthly milk report.

(b) Application for the Roll of Honor shall be made on the regular forms as for the Advanced Registry. Providing the date of service takes place within 120 days from the date the test is begun, the cow may qualify upon producing her minimum requirements for the Advanced Registry, and a living calf from service, as noted above, which she has carried for at least 180 days of her test period. Affidavit must be furnished the Secretary of the Association covering the exact date of birth of living progeny in order to qualify.

(c) All females qualifying for the Roll of Honor shall be charged \$1.00 in addition to the Advanced Registry charges, on receipt of which a Roll of Honor certificate will be issued.

AMENDMENT

GOVERNING ADVANCED REGISTRY AND ROLL OF HONOR

These rules may be altered, amended or added to by a two-thirds vote of the members present at any regular meeting of the Association, notice of proposed amendment having been given in the call for said meeting.

AYRSHIRE BREEDERS' ASSOCIATION

RECORDING FEES

Females. The fees for recording all females under six months of age shall be \$2.00; over six months and under two years, \$4.00 when owned by a member of the Association. To non-members double these fees will be charged. To members or non-members \$10.00 for all females over two years of age.

Males. The fee for males under one year of age shall be \$4.00 when owned by a member of the Association, except in the case of

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a bull under six months of age, whose sire and dam, or dam and paternal grandam, or all four of whose grandparents are in the Advanced Registry, when the fee shall be \$2.00. Double the rate to non-members.

For all males over one year of age \$10.00 to members and non-members.

Miscellaneous. An ancestor may be recorded for \$1.00 by a person not the breeder or owner, to complete a pedigree. The number given shall be the property of the Association, and no certificate shall be issued. If the breeder of this animal, or anyone who at any time has owned it, wishes to use this number, a certificate shall be furnished him on payment of the regular fee for recording such animal.

Applications for registry not accompanied by the necessary fees shall be filed, and the applicant notified of the amount lacking, and if full fees have not been received at thirty days from the date of this notice, the papers and fees sent, if any, shall be returned to the sender.

* In any case, the age limit shall be governed by the date upon which the fees for recording were mailed at the office of the sender as indicated by the Post Office stamp.

The Registry Certificate and Transfer Fee must accompany the application for Transfer. Fee for Transfer shall be \$1.00. Double this rate to non-member. When a transfer is not reported within three months of sale, the fee shall be doubled.

All Certificates of Registry and Transfer when ready for delivery shall be returned to the person sending them unless otherwise directed. In all cases the Certificate of Registry should follow the animal through the various ownerships.

An individual membership shall be continued after the death of a member in the settlement of his estate until the same shall be settled, and then the membership shall cease. In case of corporations, the corporation may continue as a member as long as it is interested in the Association, and shall be represented by such person as may be designated by the President and Secretary of the corporation.

The surviving member of a firm may be the member of the Association. A firm shall have but one address.

Registration of Name of Farm. A member of the Ayrshire Breeders' Association shall be allowed to register the name of his farm, or some distinctive name to be used as a prefix or affix to the name of his cattle in registering in the Ayrshire Record, which

name shall belong to him exclusively, and for which a fee of five dollars shall be charged.

In accepting names for registration of farms priority in use shall be allowed, and upon a request to use a name that has for a long time been used by a breeder, the Secretary shall consult the senior user, and allow him to continue to register under that name upon payment of the fee, but if he does not care to do so, then another breeder may use that name.

It was voted to instruct the Secretary to refuse to register animals under names that are misleading, either as to origin or relationship.

Advanced Registry. No cow shall be admitted to Advanced Registry unless she shall have been previously recorded in the Ayrshire Record. A fee of Three Dollars (\$3.00) shall accompany the individual application for admission for Advanced Registry test within 30 days of beginning of test. On completion of test and qualifying for the Advanced Registry, a fee of Two Dollars (\$2.00) shall entitle the owner to an A. R. Certificate. On qualifying for the Roll of Honor an additional fee of One Dollar (\$1.00) shall entitle the owner to a Roll of Honor Certificate.

All the expense incurred in making these tests shall be borne by the owner of the animal tested. Should check tests be deemed necessary, they shall be made at the expense of the Association. Owners of cows being tested shall pay all station bills for testing direct to the station, but upon notification of unpaid bills the Association shall suspend the delinquent from all benefits from the Association until full settlement shall be made.

No bull may be admitted to Advanced Registry unless he shall have been previously recorded in the Ayrshire Record. A bull qualifying for the Advanced Registry may be recorded free of charge, with name and number, and name and address of breeder, but no Certificate shall be issued.

CHAPTER XII

THE STORY OF THE GUERNSEY¹

THE GROUP to which the Island of Guernsey belongs, known as the Channel, or at one time the Alderney Isles, has had a most important place in the history of the civilization of the world. Separated as they are from England and the continent by those bits of silvery sea, dangerous of approach, well fortified, it is no wonder we find on these islands a sturdy and self-reliant race of people. Guernsey points with pride to Jersey that she was never conquered, while Jersey has never forgiven her sister for being a few miles nearer the London market. It is to these two Islands that breeders of dairy cattle owe much for the foundation of the two breeds of cattle so well known as producers of dairy products of the highest quality.

The Island of Guernsey is nine by thirteen miles, comprising 15,000 acres, on which there are 45,000 people practically all dependent on the soil and agricultural work for a living. With the exception of Alderney, the Island of Guernsey lies in the most exposed position, just where the waters of the Atlantic Ocean and North Sea are vying with each other for supremacy.

¹ Furnished by the America Guernsey Cattle Club.

Professor Low in writing of the Island cattle in general in the early part of the century, uses the term Alderney and speaks of them as "Orange, fawn and white, with a darker shade of head and neck, with a white switch." This describes essentially a Guernsey of the modern day.

That the cattle of the Islands were much alike originally is not to be doubted. Unquestionably the divergence came when the Jerseyman, skilled and persistent in breeding, sought to give the English fancier a cow to grace the lawns of the English estate. He succeeded with rich reward. The Guernsey man with his conservatism, had faith in the yellow and white cow. To him, his was the farmer's cow with golden skin and quiet temper.

It is known that as early as 1789 measures were taken against importation of stock to the Islands. In 1819 more stringent laws were enacted, and importation of live cattle, except for slaughter, was prohibited. It was then that the Islanders isolated themselves from the cattle kingdom and began their zealous work of improvement.

In 1818 Reuben Haines of Germantown, Pennsylvania, brought some Guernseys to the United States. So far as is known this is the earliest introduction of the breed to America and it is to be regretted that no records of this lot or its descendants were available as foundation stock when the herd register was established.

In 1833 the captain of a sailing vessel that called at the Island was so much impressed with the fine quality of the cattle, that he brought to the port of

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Boston three head, a bull and two heifers. These were sent to his brother on what is now known as Cow Island, Lake Winnepesaukee, New Hampshire. Through the carefully kept diary and records of an elderly gentleman we were able to trace this importation to the custom records, and there, owing to the great Boston fire in the '70's, the record was lost.

In 1840 some of the older families around Philadelphia had Guernseys in their private dairies, and in about 1865 the Fowlers of this city made an importation from the Island.

In 1872 Mr. James M. Codman, of Brookline, Massachusetts, President Emeritus of The American Guernsey Cattle Club, went to the Channel Islands with the object of investigating the two leading breeds there. Especially admiring the color and character of the dairy products of Guernsey, he selected and imported a small herd. This lot and their products so attracted the members of the Massachusetts Society for Promoting Agriculture that Mr. Codman, one of their members, purchased another lot the following year, and these importations founded the herds of Messrs. Codman, Perkins, Bowditch, Lawrence and others. The descendants of these herds are still to be found on the estates of these gentlemen and the heirs into whose hands the care of the cattle has fallen are all zealous admirers of the breed and are actively promoting its welfare. Some Connecticut gentlemen who were impressed with the merits of these cows later sent a party to the Island to make a further selection.



LADYSMITH'S CHERUB

For many years these cattle were jealously guarded on private estates, where the owners did not wish to push their herds from a breeder's standpoint. They had ample opportunity for selling their surplus, and little attempt was made for public recognition.

The percentage of butter fat in milk has become the universal basis for computing the market value of milk. The average content of butter fat in Guernsey milk is 5 per cent. This figure is obtained from the average of over 7500 official years' records which have been completed. These records were made by cows of all ages, and the average production per cow is 8999.52 pounds of milk and 450.08 pounds of butter fat. Nine Guernsey cows have records averaging over 20,000 pounds of milk, and 1,000 pounds of butter fat.

This unusual ability of the Guernsey cow to produce a large quantity of milk and butter fat is not limited to artificial short time periods. There are a great many instances on record in which cows have regularly produced in this manner. One quite outstanding instance is that of a cow that, in five lactation periods, produced an average of 11,440.9 pounds of milk and 603.14 pounds of butter fat. To go with this five years' work, she produced six calves, of which three were females. These three daughters have, up to the present time, completed eight official years records, all but two made before maturity, which average 11,327.2 pounds of milk and 616.27 pounds of butter fat.

While the Guernsey is pre-eminently a cream and

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butter breed, it has been found within the last few years that the color and flavor of her milk, combined with the large quantity which she produces, has placed her as a favorite for catering to the choicest trade in the sale of milk.

The erroneous impression is carried by some dairy-men that the Guernsey produces only a small quantity of rich milk. As to her capabilities along this line we have but to point to our Advanced Register work and its results. The average production for the mature Guernsey as shown by over 2300 records is over 10,000 pounds of milk in one year.

As to the possibilities that may be attained along this line we mention the year's production of Murne Cowan 19597 of 24,008 pounds and the wonderful production of the two-year-old heifer Nugget's Primrose 48835 of 15,436 pounds.

The two qualities, color and flavor, have won for the breed not only popular approval of the most discriminating trade, but also have won many first prizes in comparative breed tests.

In considering the matter of color it is important to remember that while spring and summer, with their fresh green feed, give more color to the products of all the breeds, the Guernsey cow alone continues during the winter to produce rich yellow milk, and even at that time of year, Guernsey butter needs no artificial coloring to make it appeal to popular taste, and bring it up to market standards. Mr. Charles L. Hill, in his "History of the Guernsey Breed," speaks of the color of Guernsey milk as follows:



NIROLETTE, 2nd



“One of the points of superiority of the Guernsey cow that first attracted the American dairyman to her was the very yellow color of her milk and butter. Practically every early mention of her, whether on the Island or in this country, calls attention to this trait of the breed. But there is no reference whatever as to why or how this characteristic became fixed. It must have been the result of generations of painstaking breeding on the part of all the early breeders of the Island, but nothing is left to show who first conceived the idea or how concerted action with this thought in view was obtained. I doubt if there is a characteristic of any other breed of livestock so pronounced as this, of which so little is known of its history that might be of great value in the study of the subject of breeding. We must content ourselves with the knowledge that the Guernsey possesses this characteristic and that it is a very much more valuable quality than even the breeders of Guernseys appreciate.

“In the present day striving for large Advanced Register records and for individual beauty as well, color of product is too often lost sight of; and if any word of advice to breeders of today is worthy of consideration, it is urging them to carefully conserve and promote this distinctive characteristic of the Guernsey cow.

“While the artificial coloring of butter is lawful in all of the states of the union and almost universally practised, the artificial coloring of milk and cream for market purposes is forbidden by law in nearly all, if not all the states.”

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The scale of points is an index of the prominent characteristics of a breed and of those lines of perfection for which constructive breeders are striving. In the case of the Guernsey we have the first instance of a scale of points for any breed in which distinctive breed characteristics have been subordinated to points representing utility. Out of a possible 100 points but two have been given to color markings and five points to size. More than one half of the entire scale has been devoted to characteristics recognized as typical of a good dairy cow. The rest of the scale, or about twenty points each, are given to two classes of characteristics: one class descriptive of proper udder formation and indicative of utility in producing large quantities of milk; the other as expressive of the natural ability of the Guernsey to color her products.

The American Guernsey Cattle Club early recognized that the cow's ability to produce butter fat should form the basis of determining her value and that the butter-maker's ability to convert that fat into butter is independent of the cow's butter fat production. It also recognized that a cow might readily be conditioned and make a remarkable short time record that would in no wise indicate the true measure of utility of a dairy cow for the average dairyman. To him it was what a cow would do year in and year out. Accordingly, the first Advanced Register for any breed of dairy cattle, based upon a year's production of butter fat, was established for the Guernsey breed.

The great advance which the breed has experi-

enced within the last few years is directly traceable to its wonderful production. The trend of both milk and fat production has been steadily upward month by month.

To obtain satisfactory prices for pure bred stock today, official tests have come to be almost a necessity. There is no method by which the breeder can so quickly build up a reputation and demonstrate to the public the merits of his herd as by making official records. It not only enables the owner to breed intelligently, but the prospective purchaser insists on knowing about production and expects to pay for it.

The Advanced Register leads to knowing, not guessing, which are the cows to keep and breed from. That the breed is being developed and improved by selection, based on Advanced Register work as a guide to breeding, is unquestionably true. In this connection and built up from Advanced Register records, our list of Great Sires and Dams has met with favor among those who wish to breed intelligently and for a definite purpose.

The American Guernsey Cattle Club has adopted the following rules governing the eligibility of bulls and cows for the Advanced Register:

Eligibility of bulls. — Every Guernsey Bull registered in the Herd Registers of The American Guernsey Cattle Club, The Royal Guernsey Agricultural Society (Alderney and Guernsey Branches), or The English Guernsey Cattle Society, and having two daughters in the Advanced Register of The American Guernsey Cattle Club, will be entered auto-

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matically without fee, and published alphabetically
in a list of Advanced Register bulls.

A certificate suitable for framing will be issued
for any bull in the list for \$2.50.

Eligibility of cows. — Every cow registered in the
Herd Register of The American Guernsey Cattle
Club may be admitted to the Advanced Register of
Guernsey Cattle upon the completion of a semi-
official yearly record made in accordance with the
following requirements:

If the record is commenced the day the animal is
two years old, or previous to that day, she must
produce within one year from that date, 250.5
pounds of butter fat. For each day the animal is
over two years old at the beginning of her year's
record, the amount of butter fat she will be required
to produce in the year will be established by adding
.1 (one tenth) of a pound for each day, to the 250.5
pounds required when two years old. This ratio is
applicable until the animal is five years old, when
the required amount will have reached 360 pounds,
which will be the amount of butter fat required of
all cows five years or over.

Any period of 365 consecutive days or less in
which a cow has made her requirements may be
used for determining her record, regardless of any
time lost on account of being dry during that period.
The record of a cow may be discontinued at any time
and if she has made her requirements a certificate
of admission to the Advanced Register may be is-
sued. If the owner desires, she may start a new

record at once, but no overlapping or use of the same day's milking in two records will be allowed.

Double letter classes. — A record of the number of days each cow carries a calf during her test is kept and published annually in the Index of Advanced Register cows.

If in addition to making the requirements in her respective class a cow shall carry a calf or calves 265 days of her test, the letters used to designate her class shall be doubled and would be:

Class AA	5	years and over.
Class BB	4½	years, to 5 years.
Class CC	4	" " 4½ "
Class DD	3½	" " 4 "
Class EE	3	" " 3½ "
Class FF	2½	" " 3 "
Class GG	2	" " 2½ "

Before the letters designating her class shall be doubled, the fact of her carrying a calf for the 265 days shall be established by the registration or filing of birth report for any calf or calves carried during the test period, or by such additional proof as the Executive Committee may require.

In the entry of a cow carrying a calf, her service date must be reported at the time of making application for entry into the Advanced Register, and all service dates during any test period must be entered on the monthly reports.

To qualify in this class, an owner may extend the test of his cow beyond the end of the year until she has carried a calf for 265 days or more. In this case the Club shall deduct a corresponding number of days from the beginning of the test.

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On the following tables is given a summary of 7943 Advanced Register records, corrected to March 1, 1919.

Summary of 7943 Advanced Register Records

	Age	Records	Lbs. Milk	Lbs. B. F.	Per cent
Class A	5 yrs. and over	2316	10,288.55	509.85	4.956
Class B	4½ "	480	9750.22	486.05	4.984
Class C	4 "	622	9354.13	469.64	5.020
Class D	3½ "	671	9146.82	461.43	5.045
Class E	3 "	793	8471.01	428.86	5.057
Class F	2½ "	959	8134.24	410.44	5.046
Class G	2 "	2102	7850.43	392.88	5.004
Av. for		7943	8999.52	450.08	5.001

Summary of 550 Double Letter Records

	Age	Records	Lbs. Milk	Lbs. B.F.	Per Cent.
Class AA	5 yrs. and over	146	9447.63	462.42	4.894
Class BB	4½ "	44	8937.32	440.83	4.932
Class CC	4 "	68	8454.36	433.42	5.126
Class DD	3½ "	47	8089.89	414.69	5.125
Class EE	3 "	62	7731.02	390.98	5.057
Class FF	2½ "	736	737.24	376.91	5.116
Class GG	2 "	118	6856.36	350.18	5.107
Av. for		558	8161.11	410.39	5.028

Great as has been the growth of the Guernsey in popular favor, and prosperous as have been her interests, there is a sense of pride and satisfaction to those who have been associated with the breed that the ground she has gained has been won by her own honest efforts as a dairy cow. She has led by measuring her efforts by the critical test of a dairy cow, what she can do in the year race, not what the butter-maker might do with her products in short time trials. In other words the Guernsey stands

for records based on butter fat production for extended periods of time.

The Guernsey is perfectly willing to rest her laurels on her ability as an economical producer of the highest grade of dairy products. It is fortunate that her friends have ever pinned their faith to the idea that to be a good Guernsey is to be a good dairy cow measured by productive capacity. One of the greatest admirers of the breed aptly indicated that we should look for our Guernseys to show that capacity for work and that ruggedness of constitution and vigor which we expect in a profitable dairy cow. The true type Guernsey should be sufficiently symmetrical to please in the show-ring. Embodying with this the prevailing characteristics of color which shall give a more definite breed type we should not forget that distinctive feature — the yellow hide — which has been handed down from the founders of the breed, the Guernsey Islanders. It is to this show of size and capacity and the distinguishing yellow richness of the products that the breed credits its growth in popular favor. It is these qualities that were developed and fixed in her upon the Island of Guernsey. It is to these qualities that the Guernsey owes her introduction into this country. With this ideal before them, the future of the Guernsey will be what the breeders make her by careful selection, mating, feeding and developing, so that she may be an animal of great dairy capacity capable of economically producing a large quantity of the best colored and flavored products.

The Guernsey breed is just on the dawn of her

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history making. Her performance has already put her in a position where she is recognized as well to the front, as one of the four leading dairy breeds. She offers the greatest opportunity of any breed for constructive breeding, since it has already been shown by the Advanced Register work that the good ones are not confined to any one or even a dozen lines. A perfection of form or production has not even been distantly approached.

Records of yearly performance are known for a far greater percentage of Guernsey cows than for cows of any other breed; therefore one can start constructive Guernsey breeding with greater initial knowledge on which to base his breeding plans than is possible with any other breed.

For the man who wishes to procure the highest quality of dairy products with greatest profits and at the same time render a real service to humanity in providing more of nature's best food, the Guernsey breed offers a wonderful opportunity.

SCALE OF POINTS FOR GUERNSEY CATTLE

ADOPTED IN MAY, 1918

BY THE AMERICAN GUERNSEY CATTLE CLUB

In publishing this score-card we realize that it is now conceded that the best way to judge of the productive capacity of a cow is to test her.

Nevertheless, we think some external characteristics indicate dairy capacity; therefore, we try to combine the recognition of these characteristics in this scale of points with those that determine symmetry and uniformity.

We urge the adoption of this scale of points by judges in an effort to make the Guernsey breed more symmetrical and uniform and still not impair its usefulness.

COLOR

We recognize that the Guernsey varies in color from the very lightest shade of fawn through the darker fawns, even to some black, but the most desirable color is a medium shade of fawn broken with white, buff nose, light fillet.

COLOR OF PRODUCT

One of the important distinguishing features of the breed is the yellow color of the milk and its products, indicated by the presence of a yellow color in the pigment of the skin. This is very pronounced and held by this breed to the greatest extent under all conditions of stabling and feed. Every effort should be made to maintain this characteristic. It is recognized that this color is accompanied by a superior flavor in the milk and its products.

SCALE OF POINTS FOR BULLS

ANATOMICAL STRUCTURE INDICATING DAIRY CONFORMATION
CONSTITUTION AND SYMMETRY

HEAD:	Clean cut, lean face, wide mouth and muzzle, wide open nostrils, and full bright masculine eye. Broad between the eyes and dishing	8	.....
HORNS:	Small at base, medium length, not too spreading	1	.....
NECK:	Long masculine neck with strong crest and clean throat	4	.....
WITHERS:	Chine rising above shoulder blades, that are moderately thick and not coarse	3	.....
BACK:	Straight from withers to hips	8	.....
HIPS:	Wide apart, not too prominent	2	.....
RUMP:	Long, continuing with level of the back, also level between hip bones and pin bones	6	.....
THURLS:	Wide apart and high	2	.....
CHEST:	Wide, and deep at heart, least depression possible back of shoulders	6	.....
BODY:	Deep and long, with well-sprung ribs which are wide apart. Thin arching flank	10

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THIGHS:	Thin, in-curving seen from side, and wide apart from rear.....	2
LEGS:	Comparatively short, clean, wide apart and nearly straight when viewed from behind, squarely set under body	2
HIDE:	Loose and pliable, and not thick, with oily feeling.....	5	.....
TAIL:	Neat and firm setting on, long, good switch.....	1	.....
RUDIMENTARY TEATS:	Teats wide apart and squarely placed.	3	.....
MILK VEINS:	Long, crooked, branching and prominent, with large, deep wells.....	5	.....
SECRETIONS INDICATING COLOR OF PRODUCT:	Indicated by the depth of yellow, inclining toward orange, of the pigment secretion of the skin on the body generally and especially discernible in the ear, at the end of bone of tail, around the eye, on the scrotum, and inside of thighs, and at base of horn. Hoofs and horns amber colored.....	20	.....
COLOR MARKINGS:	A shade of fawn with white markings.	5	.....
SIZE:	Mature bulls about 1600 lbs.....	7	.....
		<hr/>	<hr/>
		100	.....

SCALE OF POINTS FOR COWS

ANATOMICAL STRUCTURE INDICATING DAIRY CONFORMATION CONSTITUTION AND SYMMETRY

HEAD:	Clean cut, lean face, wide mouth and muzzle with open nostrils, full bright eye with gentle expression. Forehead long, broad between the eyes and dishing.....	6	.....
HORNS:	Small at base, medium length, not too spreading.....	1	.....
NECK:	Long and thin: clean throat.....	2	.....
WITHERS:	Chine rising above shoulder blades that are moderately thick and not coarse.....	3	.....
BACK:	Straight from withers to hips.....	8	.....

HIPS:	Wide apart, not too prominent.....	2	.....
RUMP:	Long, continuing with level of the back, also level between the hip bones and pin bones	5	.....
THURLS:	Wide apart and high	2	.....
CHEST:	Wide, and deep at heart, with least depression possible back of the shoulders.....	4	.....
BODY:	Deep and long, with well-sprung ribs which are wide apart. Broad loin. Thin arching flank	10	.....
THIGHS:	Thin, incurving seen from side, and wide apart from rear	2	.....
LEGS:	Comparatively short, clean, wide apart and nearly straight when viewed from behind, squarely set under body	2	.....
HIDE:	Loose and pliable, and not thick, with oily feeling	3	.....
TAIL:	Neat and firm setting on, long, good switch.....	1	.....
UDDER:	Veins prominent	2	.....
	Attachment to body long and wide ...	2	.....
	Extending well forward	5	.....
	Level and well up behind	4	.....
	Teats of good even size, well apart and squarely placed	5	.....
MILK VEINS:	Long, crooked, branching and prominent, with large deep wells.....	4	.....
SECRETIONS INDICATING COLOR OF PRODUCT:	Indicated by the depth of yellow, inclining toward orange of the pigment secretion in the skin, on the body generally, and especially discernible in the ear, at the end of bone of tail, around the eye, on the udder and teats and at the base of horns. Hoofs and horns amber colored.....	20	.....
COLOR MARKINGS:	A shade of fawn with white markings.	2
SIZE:	Mature cows about 1100 lbs. in milking condition.....	5
		<hr/>	<hr/>
		100

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NOTE: *Further information regarding the Guernsey Breed may be secured from The American Guernsey Cattle Club, Peterborough, New Hampshire.*

CHAPTER XIII

HOLSTEIN-FRIESIAN CATTLE

“Origin and Development. — The strongly marked black and white cattle of North Holland and Friesland constitute one of the very oldest and most notable of the dairy breeds. The historians of this race claim that it can be traced back for two thousand years, during which the breed continuously occupied the territory named and was always famous for dairy purposes. Tradition has it that two ancient tribes located upon the shores of the North Sea before the beginning of the christian era; one possessed a race of cattle pure white and the other a kind all black. Both the men and the cattle then became amalgamated, forming the people and herds which for centuries have occupied that region. Holland has been noted for dairy products for at least a thousand years, and the great bicolored beasts upon which this reputation has been gained have been slowly but surely developing their present form of dairy excellence.

These cattle have been known by several different names, in both Europe and America. “Holland Cattle,” “North Hollanders,” “Dutch Cattle,” “Holsteins,” “Dutch Friesians,” “Netherland Cattle,” and “Holstein-Friesians,” are all the same. There was

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sharp contention in this country before the last name was agreed upon and generally accepted. It seems unfortunate that the simple and sufficiently descriptive and accurate name of "Dutch cattle" was not adopted.

"The large frame, strong bone, abundance of flesh, silken coat, extreme docility, and enormous milk yield of the Holstein-Friesians result from the rich and luxuriant herbage of the very fertile and moist reclaimed lands upon which the breed has been perfected, the uncommonly good care received from their owners and the close association of people and cattle. The Roman dominion brought improvements in draining and diking, in methods of cultivation and of cattle breeding, but no mixture of blood occurred with the inhabitants or in their herds. The preservation of the Friesian people and their continued adhesion to cattle breeding for more than two thousand years is one of the marvels of history. Always few in number, and though the conflicts of war and commerce have raged over and around them, they have remained in or near their original home, continuously following their original pursuits. Their farmhouses are fashioned after the same general model; the one immense roof covers everything that needs protection. Here the cattle find shelter during the long and rigorous winter months. Here they are fed and groomed and watched for months without being turned from the door. Here the family is also sheltered, sometimes with only a single partition between the cattle stalls and the kitchen and living room. Everything is kept with a degree of neatness

marvelous to those not accustomed to such system. The cattle become the pets of the household. At the opening of spring or when grass is sufficiently grown they are taken to the fields and cared for in the most quiet manner. Canvas covers protect their bodies from sun and storm and insects. The grasses upon which they feed are rich and luxurious, and the animals have to move about very little to gather sufficient food. On the first appearance of winter they are returned to the stable and the simple round of the year is completed. This round is repeated until the cattle are 6 or 7 years of age, when they are usually considered as past the period of dairy profit and are sent to the shambles. The object is always to produce as much milk and beef as possible from the same animal. With this two-fold object in view, selection, breeding and feeding have been continued for ages." (*Houghton*)

This condensed description of the origin, development and home treatment of this breed of cattle goes far toward explaining the characteristics of the breed as seen in this country.

The early Dutch settlers in America undoubtedly brought their favorite cattle with them during the seventeenth century, and there are definite records of three or four importations prior to 1850, but the credit of first introducing this breed to America and maintaining its purity here is due to Winthrop W. Chenery, of Massachusetts. He made three importations between 1857 and 1862. The Messrs. Gerrit S. and Dudley Miller, of New York, followed in 1867, and soon thereafter numerous

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others brought animals of this breed in considerable numbers to the United States. They have increased rapidly by importations and breeding, and are now to be found in nearly all parts of this country.

Characteristics. — The striking features in the appearance of this breed are the color markings of black and white and the large size of the animals of both sexes. The shining jet black contrasts vividly with the pure white, the fine, silky hair growing upon a soft and mellow skin of medium thickness. In some animals the black predominates, and the white in others. Black has been rather preferred among American breeders, to the almost entire exclusion of white in some cases, yet a very few noted animals have been mainly white. The average animal carries rather more black than white, and the distribution and outlines of the markings are extremely irregular. The black and white are never mixed, the outlines of demarkation being usually sharply drawn. In Europe there are still some red cattle of this breed, and occasionally a pure-bred calf is dropped in this country with bright red instead of black, showing the influence of some remote ancestor, but none are admitted to the American herd book except those black and white. In size the Holsteins are the largest of all the dairy breeds. The big, bony frames are usually filled out, and the chest, abdomen, and pelvic region are fully developed. It is difficult to prevent the males from becoming too fleshy for breeding animals, and the females, when not in milk, take on flesh rapidly and soon become full in form. The cows range in weight from 1,000

to 1,500 pounds, most of them being between 1,100 and 1,400, with an average of about 1,250 pounds. The bulls at maturity are very large and heavy, often above 2,500 pounds in weight. The head is long, rather narrow and bony, with bright yet quiet eyes and large mouth and nostrils. The horns are small and fine, often incurving, and frequently white with black tips. The ears are large, thin, and quick in movement. The neck is long, slender, and tapered in the cows, its upper line often quite concave. The back line is usually level, particularly with the males, and the hips broad and prominent, some have well rounded buttocks, but a drooping rump is not uncommon. The legs appear small for the weight carried and are quite long, the tail is long and fine, and a white brush is required. The udder is often of extraordinary size, filling the space between legs set well apart, extending high behind and fairly well forward, with teats of large size and well placed. The teats are sometimes cone shaped and uncomfortably large and puffy where attached to the udder. The milk veins are usually prominent and sometimes remarkably developed. There is a more marked inclination toward the beef form among the bulls than among the cows; the latter are generally of the true dairy type.

“In temperament these animals are quiet and docile, bulls as well as cows, and the bulls exceptionally so. They have great constitutional vigor. The calves are large at birth, almost always strong and thrifty, and they grow fast and fatten easily. They mature early, heifers reaching their full weight at

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two and a half years, and showing no growth after four or five years except the addition of flesh and fat. Animals of both sexes can be readily turned into very good beasts for slaughter at almost any age, but they lack depth in the loin and ribs and have not the finish and quality of the noted beef breeds. These animals are very large feeders and at the same time dainty about their eating. To do their best they must have an abundance of rich food without the necessity of much exertion to get it." *From U. S. Dept. of Agriculture, Farmers' Bulletin No. 106.*

"Milk and fat records. — The champion cows for yearly production in the seven different divisions are as follows:

<i>Full-aged Class</i>	<i>Milk (Pounds)</i>	<i>Fat (Pounds)</i>
Duchess Skylark Ormsby	27,761.7	1,205.09
Senior four-year-old class		
Keystone Beauty Plum Johanna	25,787.5	1,035.77
Junior four-year-old class.		
Queen Piebe Mercedes	30,230.2	1,111.55
Senior three-year-old class		
Duchess Hengerveld Korndyke	22,897.0	903.38
Junior three-year-old class		
Finderne Holingen Fayne	24,612.8	1,116.05
Senior two-year-old class		
K. P. Manor Kate	22,106.4	818.73
Junior two-year-old class		
Finderne Mutual Fayne	22,150.4	960.51

ADVANCED REGISTRY RULES

"Requirements for entry of cows on short time official tests. — If a cow calve on the day she is two years of age or previous to that day, she must pro-



KING SEGIS PONTIAC KONIGEN

duce 7.2 pounds fat in seven consecutive days; and for every day that she may exceed two years of age at the time of calving, up to the time she is five years of age, the requirement is increased by .00439 of a pound fat. This brings the increased requirement to 1.6 pounds fat per year. The requirement for a cow calving at just three years of age is accordingly 8.8 pounds fat in seven consecutive days; at just four years of age, 10.4 pounds fat; and at just five years of age, 12 pounds of fat. After a cow reaches five years, there is no further increase in the requirement, which remains at 12 pounds fat.

“Requirement for entry of cows in long time semi-official test. — If a cow calve on the day she is two years of age or previous to that day she must, for the ten months record, produce not less than 220.5 pounds fat in not to exceed 305 consecutive days, while for a yearly record she must produce within a period exceeding 305 days and not exceeding 365 days not less than 250.5 pounds fat. For every day that a cow may exceed two years of age at the time of calving, up to the day she is five years of age, the requirement in butter fat is increased by a tenth of a pound of fat daily for each day's increase in age. This brings the increased requirement to 36.5 pounds fat per year; the requirement for a cow calving at just three years of age being 257 pounds fat in not exceeding ten months, and 287 pounds fat in not exceeding one year; at just four years of age 293.5 pounds fat in not exceeding ten months, and 323.5 pounds fat in not exceeding one year; and at just five years of age 330 pounds fat in not exceeding

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ten months, and 360 pounds fat in not exceeding one year. After a cow reaches the age of five years there is no increase in the requirement, which remains 330 pounds fat for a test not exceeding 10 months and 360 fat for a test not exceeding one year.

“Requirements for entry of bulls. — Only bulls having not less than four daughters either A. R. O., A. R. S. O., or a combination of the two, that have been admitted to advanced registration are eligible to entry in the Holstein Friesian Advanced register; and the Superintendent will, without any special application having been made, make entry of all bulls as soon as they have the required number of daughters. An A. R. O. daughter is one that has been entered in the Advanced Register on an official test. An A. R. S. O. daughter is one that has been admitted on a semi-official test without a not less than 7-day official test.

“Application for permit. — No person or persons shall have the record of any cow entered in the Holstein-Friesian Advanced register, unless previous application shall have been made by the owner, or person in charge, to be superintendent of Advanced Registry for permission to test, and a permit shall have been issued by the Superintendent.

“Registration. — In the Herd Book there shall be registered only such animals as are determined under the rules and regulations of this corporation to be ‘pure-bred’ Holstein-Friesian.

“Pure-bred Holstein Friesian shall be held to mean and refer to only those large, improved black and white cattle already registered in the Holstein,



DUCHESS SKYLARK ORMSBY

Dutch Friesian, Holstein Friesian, or the Western Holstein-Friesian Herd Books, and such as are descended from them in direct line, both as to sire and dam; and such imported animals, or other descendants, as are registered in the Netherlands, or Friesian, or North Holland Herd Book.

"Colors that bar registry. — (1) Solid black; (2) solid white; (3) black switch; (4) solid black with white on belly only; (5) black on legs, beginning on feet and extending to knees and hocks; (6) black on legs, beginning at feet and extending to knees, with white interspersed; (7) gray or mixed black and white generally prevailing; (8) patches of other colors than black or white, red, brown, dun, etc.; (9) red and white." *Furnished by the Holstein-Friesian Association of America, Brattleboro, Vermont.*

SCORE CARD FOR HOLSTEIN-FRIESIAN COW

Name Reg. No.

Dropped Weight.....

The interlines in smaller type relate entirely to the method of application agreed upon by the Inspectors, in order to secure uniformity of work. The abbreviations are as follows: vs, very slight; s, slight; m, marked; vm, very marked, e, extreme.

<i>Parts</i>	<i>Description</i>	<i>Possible Score</i>	<i>Discredits</i>
HEAD	Decidedly feminine in appearance; fine in contour Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{2}$, vm $\frac{1}{2}$, e 1.	2	
FOREHEAD....	Broad between the eyes; dishing..... Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{2}$, vm $\frac{1}{2}$, e 1.	2	

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SCORE CARD FOR HOLSTEIN-FRIESIAN COW (Continued)

<i>Parts</i>	<i>Description</i>	<i>Possible Score</i>	<i>Discredits</i>
FACE	Of medium length; clean and trim, especially under the eyes; showing facial veins; the bridge of the nose straight..... Discredit, s $\frac{1}{2}$, m $\frac{1}{2}$, e $\frac{1}{2}$	2	
MUZZLE	Broad, with strong lips..... Discredit, s $\frac{1}{2}$, m $\frac{1}{2}$, e $\frac{1}{2}$.	1	
EARS	Of medium size; of fine texture; the hair plentiful and soft; the secretions oily and abundant..... Discredit, m $\frac{1}{2}$, e $\frac{1}{2}$.	1	
EYES.....	Large; full; mild; bright..... Discredit, s $\frac{1}{2}$, m $\frac{1}{2}$, e $\frac{1}{2}$.	2	
HORNS	Small; tapering finely towards the tips; set moderately narrow at base; oval; inclining forward; well bent inward; of fine texture; in appearance waxy . Discredit, m $\frac{1}{2}$, e $\frac{1}{2}$.	1	
NECK	Long; fine and clean at juncture with the head; free from dewlap; evenly and smoothly joined to shoulders.... Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{2}$, vm $\frac{1}{2}$, e 1.	4	
SHOULDERS ...	Slightly lower than the hips; fine and even over tops; moderately broad and full at sides..... Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{2}$, vm $\frac{1}{2}$, e 1.	3	
CHEST	Of moderate depth and lowness; smooth and moderately full in the brisket; full in the foreflanks (or through at the heart)..... Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m 1, vm $1\frac{1}{2}$, e 2.	6	

SCORE CARD FOR HOLSTEIN-FRIESIAN COW
(Continued)

<i>Parts</i>	<i>Description</i>	<i>Possible Score</i>	<i>Dis-credits</i>
CROPS.....	Moderately full Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{2}$, vm $1\frac{1}{2}$, e 2.	2	
CHINE.....	Straight; strong; broadly developed, with open vertebrae Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{2}$, vm $\frac{1}{2}$, e 1.	6	
BARREL.....	Long; of wedge shape; well rounded; with a large abdomen, trimly held up. (In judging the last item age must be considered.) Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{2}$, vm $\frac{1}{2}$, e 1.	7	
LOIN (AND HIPS)	Broad; level or nearly level between the hook-bones; level and strong later- ally; spreading from chine broadly and nearly level; hook-bones fairly prominent Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{2}$, vm $\frac{1}{2}$, e 1.	6	
RUMP.....	Long; high; broad with roomy pelvis; nearly level laterally; comparatively full above the thurl; carried out to dropping of tail. Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{2}$, vm $\frac{1}{2}$, e 1.	6	
THURL.....	High; broad Discredit, vs, $\frac{1}{2}$ s $\frac{1}{2}$, m 1, vm $1\frac{1}{2}$, e 2.	3	
QUARTERS....	Deep; straight behind; twist filled with development of udder; wide and moderately full at the sides Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{2}$, vm $\frac{1}{2}$, e 1.	4	
FLANKS.....	Deep; comparatively full Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{2}$, vm $\frac{1}{2}$, e 1.	2	

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SCORE CARD FOR HOLSTEIN-FRIESIAN COW (Continued)

<i>Parts</i>	<i>Description</i>	<i>Possible Score</i>	<i>Discredits</i>
LEGS.....	Comparatively short; clean and nearly straight; wide apart; firmly and squarely set under the body; feet of medium size, round, solid and deep.. Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{2}$, vm $\frac{1}{2}$, e 1.	4	
TAIL.....	Large at base, the setting well back; tapering finely to switch; the end of the bone reaching to hocks or below; the switch full Discredit, s $\frac{1}{2}$, m $\frac{1}{2}$, e $\frac{1}{2}$.	2	
HAIR AND HANDLING...	Hair healthful in appearance; fine, soft and furry; the skin of medium thickness and loose; mellow under the hand; the secretions oily, abundant and of a rich brown or yellow color.. Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m 1, vm $1\frac{1}{2}$, e 2.	8	
MAMMARY VEINS.....	Very large; very crooked (age must be taken into consideration in judging of size and crookedness); entering very large or numerous orifices; double extension; with special developments, such as branches, connections, etc. Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m 1, vm $1\frac{1}{2}$, e 2.	10	
UDDER.....	Very capacious; very flexible; quarters even; nearly filling the space in the rear below the twist; extending well forward in the front; broad and well held up Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m 1, vm $1\frac{1}{2}$, e 2.	12	

SCORE CARD FOR HOLSTEIN-FRIESIAN COW
(Continued)

<i>Parts</i>	<i>Description</i>	<i>Possible Score</i>	<i>Dis- credits</i>
TEATS.....	Well formed; wide apart; plumb and of convenient size Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m 1, vm $1\frac{1}{2}$, e 2.	2	
ESCUTCHEON..	Largest; finest..... Discredit, vs $\frac{1}{2}$, s 1, m 2, vm 3, e 4.	2	
	Perfection.....	100	
	Total discredit.....		
	Net score.....		

.....
UDGE

SCORE CARD FOR HOLSTEIN-FRIESIAN BULL

Name..... Reg No.....

Dropped Weight.....

The interlines in smaller type relate entirely to the method of application agreed upon by the Inspectors, in order to secure uniformity of work. The abbreviations are as follows: vs, very slight; s, slight; m, marked; vm, very marked; e, extreme.

<i>Parts</i>	<i>Description</i>	<i>Possible Score</i>	<i>Dis- credits</i>
HEAD.....	Showing full vigor; elegant in contour. Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{2}$, vm $\frac{1}{2}$, e 1.	2	
FOREHEAD....	Broad between the eyes; dishing..... Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{2}$, vm $\frac{1}{2}$, e 1.	2	
FACE.....	Of medium length; clean and trim, especially under the eyes; the bridge of the nose straight Discredit, s $\frac{1}{2}$, m $\frac{1}{2}$, e $\frac{1}{2}$.	2	

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SCORE CARD FOR HOLSTEIN-FRIESIAN BULL (Continued)

<i>Parts</i>	<i>Description</i>	<i>Possible Score</i>	<i>Discredits</i>
MUZZLE.....	Broad, with strong lips Discredit, s $\frac{1}{2}$, m $\frac{1}{4}$, e $\frac{1}{4}$.	1	
EARS.....	Of medium size; of fine texture; the hair plentiful and soft; the secretions oily and abundant Discredit, m $\frac{1}{2}$, e $\frac{1}{4}$.	1	
EYES.....	Large; full; mild; bright..... Discredit, s $\frac{1}{2}$, m $\frac{1}{4}$, e $\frac{1}{4}$.	2	
HORNS.....	Short; of medium size at base; gradually diminishing towards tips; oval; inclining forward; moderately curved inward; of fine texture; in appearance waxy..... Discredit, m $\frac{1}{2}$, e $\frac{1}{4}$.	1	
NECK.....	Long; finely crested (if the animal is mature); fine and clean at juncture with the head; nearly free from dewlap; strongly and smoothly joined to shoulders Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{4}$, vm $\frac{1}{4}$, e 1.	5	
SHOULDERS...	Of medium height; of medium thickness, and smoothly rounded at tops; broad and full at sides; smooth over front Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{4}$, vm $\frac{1}{4}$, e 1.	4	
CHEST.....	Deep and low; well filled and smooth in the brisket; broad between the forearm; full in the foreflanks (or through at the heart) Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m 1, vm $1\frac{1}{2}$, e 2.	7	
CROPS.....	Comparatively full; nearly level with the shoulders Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m 1, vm $1\frac{1}{2}$, e 2.	4	

SCORE CARD FOR HOLSTEIN-FRIESIAN BULL
(Continued)

<i>Parts</i>	<i>Description</i>	<i>Possible Score</i>	<i>Dis-credits</i>
CHINE.....	Strong; straight; broadly developed, with open vertebrae..... Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{2}$, vm $\frac{1}{2}$, e 1.	6	
BARREL.....	Long; well rounded; with large abdomen, strongly and trimly held up. Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{2}$, vm $\frac{1}{2}$, e 1.	7	
LOIN AND HIPS	Broad; level or nearly level between hook-bones; level and strong laterally; spreading from the chine broadly and nearly level; the hook-bones fairly prominent..... Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m 1, vm $1\frac{1}{2}$, e 2.		
RUMP.....	Long; broad; high; nearly level laterally; comparatively full above the thurl; carried out straight to dropping of tail..... Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{2}$, vm $\frac{1}{2}$, e 1.	7	
THURL.....	High; broad..... Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m 1, vm $1\frac{1}{2}$, e 2.	4	
QUARTERS....	Deep; broad; straight behind; wide and full at sides; open in the twist.. Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{2}$, vm $\frac{1}{2}$, e 1.	5	
FLANKS.....	Deep; full..... Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{2}$, vm $\frac{1}{2}$, e 1.	2	
LEGS.....	Comparatively short; clean and nearly straight; wide apart; firmly and squarely set under the body; arms wide, strong and tapering; feet of medium size, round, solid and deep.. Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{2}$, vm $\frac{1}{2}$, e 1.	5	

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SCORE CARD FOR HOLSTEIN-FRIESIAN BULL (Continued)

<i>Parts</i>	<i>Description</i>	<i>Possible Score</i>	<i>Dis-credits</i>
TAIL.....	Large at base, the setting well back; tapering finely to switch; the end of bone reaching to hocks or below; the switch full Discredit, s $\frac{1}{2}$, m $\frac{1}{2}$, e $\frac{1}{2}$.	2	
HAIR AND HANDLING....	Hair plentiful in appearance; fine, soft and furry; skin of medium thickness and loose; mellow under the hand; the secretions oily, abundant and of a rich brown or yellow color. Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m 1, vm $1\frac{1}{2}$, e 2.	10	
MAMMARY VEINS.....	Large; full; entering large orifices; double extension; with special development, such as forks, branches, connections, etc..... Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m 1, vm $1\frac{1}{2}$, e 2.	10	
RUDIMENTARY TEATS.....	Large; well placed..... Discredit, vs $\frac{1}{2}$, s $\frac{1}{2}$, m $\frac{1}{2}$, vm $\frac{1}{2}$, e 1.	2	
ESCUTCHEON..	Largest; finest..... Discredit, vs $\frac{1}{2}$, s 1, m 2, vm 3, e 4.	2	
	Perfection.....	100	
	Total discredit.....		
	Net score.....		

JUDGE

NOTE: Further information regarding Holstin-Friesian cattle may be obtained from the Secretary, Brattleboro, Vermont.

CHAPTER XIV

JERSEYS¹

THE MOST highly prized domestic and farm animal is the Jersey cow. This famous breed of cattle holds a distinguished place in the dairy world because of the excellent quality of milk the Jersey produces. She holds the favored corner in the heart of animal lovers because she is beautiful and docile, as well as being a good producer of rich milk, thick cream and golden butter.

Need I remind the reader that Jersey cattle come from the Island of Jersey in the English Channel? Victor Hugo said: "Jersey is a lovely garden of the sea." And Jersey is really all of that, as it is perhaps the only spot in Europe that enjoys the equable year round climate of California. This is due to the fact that the Gulf Stream circulates about it, and cold spells are wafted away by the effects of this warm current. There is a variation of but ten degrees throughout the year.

Politically the Island of Jersey has a most interesting history. Geographically belonging to France and made up for the most part of French speaking people. Jersey is a small part of the British Em-

¹ Furnished by Mr. A. L. Tichane, The American Jersey Cattle Club, 324 W. 23d St. New York, N. Y.

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pire, but enjoys home rule and has always maintained domestic independence. The Channel Islands are all that remain of the old Norman duchy that once conquered England.

Jersey is only twelve miles long and about half that many miles in width, with a population of about 54,000. The chief occupation of the inhabitants is the cultivation of fruits and vegetables for the English market. The development of the dairy cattle of Jersey presents a most interesting study on the effect of environment and climate on the development of a breed of dairy cattle.

Breeders of cattle on the Island of Jersey will handle no other breed, as they recognize the need for straight breeding. A law has been in effect for more than two hundred years that prevents the importation of other cattle to Jersey except for immediate slaughter. This has resulted in keeping the breed pure and has placed the stamp of prepotency and uniformity on Jerseys to the degree that the Jersey breed is without competition on this point.

America is rapidly coming to the front as a country where the pure bred and thoroughbred animal is appreciated and loved. With Jersey it was a case of developing that beauty and symmetry of form that attracts lovers of well bred stock.

Let us consider the reasons for the various qualities that are bred into a good dairy cow — in this case the Jersey. Beauty of form in the present degree has been attained with the help of a series of yearly shows in every parish on the Island. These serve to educate the breeder and develop his in-



JENNIE YOUT'L DO
(Daughter of Imp. Oxford You'll Do)

stinct for selecting individuals for breeding purposes that will produce animals of certain type and characteristics. It always holds true that "like begets like or the likeness of some ancestor," therefore if we study closely the lines and qualities of certain individuals it is possible to obtain young stock that will be at least as good as and nearly always better than its ancestors. The goal is not always to be reached in one generation, but in some cases it requires several years of effort before the ideal set by the breeder is attained.

Why is it that Jerseys are the producers of richer milk than other dairy cattle, and why are they able to produce this high quality product with a minimum amount of feed? The island of Jersey is small and there is no such thing as unlimited pasture, therefore Jerseys are tethered or tied to a stake, and they must clean up the allotted space each day before being tied in pastures new. Hundreds of years practice at this form of pasturing has inbred the quality of economy. They make the best use of every morsel of food and every blade of grass given them.

These economical traits are responsible for the richness of their milk, as you will readily grasp from the following facts. Forms of feed containing large quantities of vegetables are consumed by grazing animals to serve a specific purpose. In the horse, energy; in beef-type cattle, accumulated flesh; in the dairy cow, butter-fat. Jerseys do not carry superfluous flesh. They are bred to carry only enough muscle and flesh for healthful activity and ample digestive force. It is for that reason that the Jersey

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manufactures, so to speak, almost all vegetable oils consumed into milk and butter-fat, the most wholesome and energizing forms of food that are used by the human race.

One of the factors contributing to the advancement of the Jersey breed in America has been its success in competition with other breeds in public demonstrations. Every now and then discussions as to the economic qualities of the breeds become so acute that a public test is arranged. On three distinct occasions the Jersey breed has been tried in the balance and proven to be the breed that can actually produce butter-fat at the lowest cost in feed. The following reports testify to this:

In "Chicago Test," 1893, "Jerseys demonstrated ability to return a greater net profit than any other breed." *Statement in official bulletin.*

In "St. Louis Test," 1904, Pounds of feed required to produce a pound of butter-fat:

Jerseys.....	12	Pounds
Holsteins.....	14.83	Pounds
Shorthorns.....	15.52	Pounds
Brown Swiss.....	16.91	Pounds

Figures taken from official report.

In "Ohio Test," 1917, the Jerseys produced fifty-two pounds of butter fat for every thousand pounds of feed consumed, while their nearest competitors produced only thirty-eight pounds of fat per thousand pounds of feed consumed. *Official figures from Ohio University Bulletin.*

While Jerseys are of refined type, it is not to be assumed that they are delicate. If a Jersey is sub-

mitted to a cold and rigorous climate she becomes somewhat coarser in appearance and builds up the ruggedness necessary to meet the conditions. A Jersey under these conditions shows a tendency to produce larger quantities of slightly lower-testing milk, as the fats are needed for body heat, but in all cases lives up to her reputation for being a most adaptable animal. In warm climates she thrives and produces even though the pastures are scanty and the heat most oppressive.

The inherent docility of the Jersey can be traced to the association of the good women folks of the Island of Jersey who are usually the caretakers or milkers of the herd. The men folk attend to the work in the fields, and the women minister to the "lowing kine." The Jersey is accustomed to good treatment and responds to good care by giving a good supply of milk. Abusive treatment will invariably draw resentment in demeanor and a slump in milk flow. As an American farm philosopher once remarked: "It pays to speak to a cow as you would to a lady."

The accompanying pictures give some idea of the remarkable development that is taking place in the breeding of Jersey cattle to-day. American families that are fortunate enough to have grazing space near their homes should consider seriously the acquisition of a good dairy cow. Good dairy cows are always an asset and never a liability. It is possible to get several quarts of rich, creamy milk each day from a good family cow, and the value of milk consumed by the family more than offsets the feed bill. It is

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hardly necessary to say that beautiful dairy cattle add to the appearance of a country home, or of a suburban home, and in this way add pride to profit.

For the farmer or cattle raiser the Jersey cow offers a steady all year income which makes him independent of unfavorable crop conditions. It is certain that the consuming public will continue to use enough milk, cream and butter to encourage the further development of America's great dairy herds, and there can be no safer investment than the ownership of a good dairy herd.

Many a man has learned that a ready market can quickly be obtained for milk, cream and butter that are labelled "Jersey." Everybody associates the name "Jersey" with food quality, and in all milk markets Jersey milk brings the highest price. The very name "Jersey" makes a splendid trade-mark as it is easy to pronounce and quite as easy to remember.

Island of Jersey herd book. — The Royal Jersey Agricultural Society on the Island of Jersey publishes the Island of Jersey Herd Book, and through its rules of entry seeks to induce breeding from the best stock, and in other ways to maintain the excellence of the breed in order to insure its advancement in popularity. Any Island cow obtaining first, second, third or fourth prize or certificate of merit at a departmental show is eligible to the Herd Book as foundation stock. The produce of qualified stock is eligible to the Herd Book. When the first calf of registered stock is presented for entry, the dam must also be presented for examination and qualification.



OXFORD'S BRIAR FLOWER
(Sold for \$10,000)

Animals approved by judges appointed by the Society are entitled to the qualification or rating "C" (commended), and those judged to be of exceptional merit are entitled to the qualification "H. C." (highly commended).

The Jersey cow in America. — The foundation stock of American Jerseys was imported in 1850 by Thomas Motley, of Massachusetts; John A. Tainter, John T. Norton, and D. Buck, of Connecticut. In 1840 a large importation was made by Henry Clay. Many others afterwards imported animals at different times, and importations have been made almost yearly even up to the present time. Shortly after the first importations of Jerseys were made into the United States, the need of a national organization was felt, and some of the leading breeders of that day began to lay plans for the establishment of an American herd book. In 1868 S. J. Sharples, Geo. E. Waring, Jr., C. M. Beach and Thos. J. Hand called a meeting of the leading Jersey breeders in Philadelphia which resulted in the organization of the American Jersey Cattle Club and the institution of its Herd Register.

Jersey popularity growing. — Another phase of the Jersey cattle industry in America is the popularity of this breed in the show ring. The Jersey standard of type has been practically accepted by all other breeds as the standard of true dairy type, and inasmuch as this refinement of type is so emphatically pronounced in one breed, interest in various cattle classes at state and national Fairs is continually centered around the breed which qualify the

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Jersey. It cannot be said that fine conformation in dairy cows is without value. As a matter of fact, it is of the greatest value, because there are only two ways of increasing the popularity of a breed. One way is from the standpoint of production, and in order to improve production consistently, conformation of the animal must keep pace. A clearer explanation of this theory can perhaps be expounded in this way: If you breed production without regard to type, you lose constitution first; loss of vigor follows loss of constitution and when vigor is lost production then commences to decline. The Jersey breed has been very fortunate in this respect. That is to say, our breeders have realized the importance of keeping up constitution in order to retain favor in the show ring. With this improvement in constitution, the natural flow of milk has also increased, and it is a very satisfying as well as significant fact that the Jersey breed to-day, while improving in type and gaining in size, is also making the greatest increase in average dairy production. The Register of Merit figures will bear out this assertion.

The accepted type of the breed is brought out by the official score cards which follow.

SCALE OF POINTS FOR JERSEY COW

*Adopted at Annual Meeting of the American Jersey Cattle Club,
May 7, 1913*

Name

DAIRY TEMPERAMENT AND CONSTITUTION

	Counts
HEAD, 7. —	
A — Medium size, lean; face dished; broad between eyes; horns medium size, incurving	3.....
B — Eyes full and placid; ears medium size, fine, carried alert; muzzle broad, with wide open nostrils and muscular lips; jaw strong ...	
	4.....
NECK, 4. —	
Thin, rather long, with clean throat, neatly joined to head and shoulders	4.....
BODY, 37. —	
A — Shoulders light, good distance through from point to point, but thin at withers; chest deep and full between and just back of fore legs	5.....
B — Ribs amply sprung and wide apart, giving wedge shape, with deep, large abdomen, firmly held up, with strong muscular development	10.....
C — Back straight and strong, with prominent spinal processes; loins broad and strong	5.....
D — Rump long to tail-setting, and level from hip-bones	6.....
E — Hip-bones high and wide apart	3.....
F — Thighs flat and wide apart, giving ample room for udder	3.....
G — Legs proportionate to size and of fine quality, well apart, with good feet, and not to weave or cross in walking	2.....
H — Hide loose and mellow	2.....
I — Tail thin, long, with good switch, not coarse at setting-on	1.....

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SCALE OF POINTS FOR JERSEY COW (Continued)

MAMMARY DEVELOPMENT

UDDER, 26. —

A — Large size, flexible and not fleshy	6.....
B — Broad, level or spherical, not deeply cut between teats	4.....
C — Fore udder full and well rounded, running well forward of front teats.....	10.....
D — Rear udder well rounded, and well out and up behind	6.....

TEATS, 8. —

Of good uniform length and size, regularly and squarely placed	8.....
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MILK-VEINS, 4. —

Large, long, tortuous and elastic, entering large and numerous orifices.....	4.....
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SIZE, 4. —

Mature cows, 800 to 1,000 pounds.....	4.....
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GENERAL APPEARANCE, 10. —

A symmetrical balancing of all the parts, and a proportion of parts to each other, depending on size of animal, with the general appearance of a high-class animal, with capacity for food and productiveness at pail.....	10.....
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Total Score..... 100.....

Date..... 191... ..Scorer.

SCALE OF POINTS FOR JERSEY BULL

*Adopted at Annual Meeting of the American Jersey Cattle Club,
May 7, 1913*

Name

HEAD, 10. —

A — Broad, medium length; face dished; narrow between horns; horns medium in size and incurving.....	Counts 5.....
B — Muzzle broad, nostrils open, eyes full and bold; entire expression one of vigor, resolution and masculinity.....	

NECK, 7. —

Medium length, with full crest at maturity; clean
at throat 7.....

BODY, 57. —

A — Shoulders full and strong, good distance
through from point to point, with well-
defined withers; chest deep and full be-
tween and just back of fore legs. } 15.....

B — Barrel long, of good depth and breadth, with
strong, rounded, well-sprung ribs. } 15.....

C — Back straight and strong 5.....

D — Rump of good length and proportion to
size of body, and level from hip-bones to
rump-bones } 7.....

E — Loins broad and strong; hips rounded, and
of medium width compared with fe-
male } 7.....

F — Thighs rather flat, well cut up behind, high
arched flank } 3.....

G — Legs proportionate to size and of fine quality,
well apart, with good feet, and not to
weave or cross in walking. } 5.....

RUDIMENTARY TEATS, 2. —

Well placed 2.....

HIDE, 2. —

Loose and mellow 2.....

TAIL, 2. —

Thin, long, reaching the hock, with good switch,
not coarse or high at setting-on. } 2.....

SIZE, 5. —

Mature bulls, 1,200 to 1,500 pounds 5.....

GENERAL APPEARANCE, 15. —

Thoroughly masculine in character, with a har-
monious blending of the parts to each
other; thoroughly robust, and such an
animal as in a herd of wild cattle would
likely become master of the herd by the
law of natural selection and survival of
the fittest. } 15.....

Total Score 100

Date 191... Scorer.

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The pure-bred Jersey business. — Pure-bred cattle always sell for more than unregistered or “grade” cows. Every pure-bred Jersey can be traced back through the books of the American Jersey Cattle Club and even through the Island of Jersey books to its ancestors. This establishes a higher value, because an animal that is thus registered comes of stock that was highly regarded in its time. Bad handling in the way of careless breeding and feeding can destroy the work of the best breeders, but it is nevertheless necessary to have animals of known ancestry for guidance in breeding. Some men can do better with “grades” than their neighbors can with pure-breds, but they could do even more if they were handling pure-bred stock. A man who is interested in breeding and who makes a study of mating animals to improve type and production, can make a fortune in a reasonable number of years with pure-bred Jerseys.

The object then, of the American Jersey Cattle Club, is to register the offspring of pedigreed or pure-bred Jerseys, so that the breed may be kept pure, so that its followers will be able to carry on this work with the assistance of reliable records.

Registering a Jersey. — When you send in the name of an animal for registration (regular blanks are supplied by the Club for this purpose) you are asked to give the name of the sire and dam of the animal to be registered, the date the dam was bred and the date on which the animal to be registered was born. Unless you are able to give this accurately you can't register the animal. The longer



CHAMPION LADY DORCAS
(Granddaughter of Bright Prince)

you wait before registering, the more chance there is that you will not be able to supply these data. The extra fee for waiting more than a year is justified, because the accuracy which the Club maintains is jeopardized by the carelessness and procrastination of some individuals, and many good animals become "grades" and are lost to the breed for the want of complete breeding records.

The Club at this writing (1919) is rendering this service to about 40,000 Jersey breeders, and its experience is that nearly half of its total correspondence could be saved if breeders followed directions more closely. The rules are simple but they must be followed to the letter, in justice to everyone engaged in the industry. The registration and transfer fees are as follows:

** For Animals Dropped in the United States and Canada*

Females one year old or under —

To members.....	\$1.00 each
To non-members.....	2.00 each

Females over one year old and not more than two—

To members.....	\$2.00 each
To non-members.....	3.00 each

Females over two years old —

To members or non-members.....	\$10.00 each
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Males one year old or under —

To members.....	\$2.00 each
To non-members.....	3.00 each

Males over one year old and not more than two —

To members.....	\$3.00 each
To non-members.....	5.00 each

Males over two years old —

To members or non-members.....	\$10.00 each
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For transfers. — Transfers of animals presented within ninety days from date of delivery, and trans-

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fers of animals *under two years* accompanying applications for their registry, 50c. each.

All other transfers presented *after* the lapse of ninety days from date of delivery to buyer, \$1.00 each.

The transferring of animals.—The transfer of animals is just as important as their registration. You may buy a registered cow and own her to all intents, but the A. J. C. C. will never recognize that fact until the man who sold her to you tells them so, because they have no other way of knowing it. He should give you his “application for transfer” on a regular form, which he, or you, can get from the club, and when this has been properly filled out and sent to the club a “certificate of transfer” is issued which makes you the new owner according to the records. You can’t register calves from a pure-bred cow unless she appears on the records as YOUR COW. Breeding dates and selling dates are items that no breeder should allow to get away from him.

Many beginners get caught in snarls that are caused by careless record keeping, and that is why they should not only begin right but should stay right after they get their start. Only a slight application of system and exactness is needed in making out all registration papers to keep relations harmonious. Never lose sight of the primary object — “to improve the breed.” You are able to improve the breed because of the records that the cattle associations keep.

The register of merit.—The Babcock system of determining the amount of butter-fat in milk has



LADY ALDAN
(Dam of Golden Fern's Noble)

superseded the old "churn" or butter test. Under the old methods of testing the milk produced by a cow was churned and made into butter. The amount of butter made from her milk was her "official" or "private" test for seven days. Those tests were at that time considered satisfactory indications of what a cow could do. When Dr. Babcock had perfected his method for separating the butterfat from the other ingredients in milk, the "butter-fat test" superseded the "butter" test.

When it became apparent that great short-time records could be made by forced feeding, sweating, and other forms of manipulation, the need for a different system of testing became apparent. The Register of Merit of the American Jersey Cattle Club was founded on the seven-day and the 365-day test, but the emphasis is being placed more and more on the 365-day test. Seven-day tests are expensive, and nearly everybody now holds that "the year's test is the only true test of a dairy cow."

The production requirements of Register of Merit tests are that cows beginning the test under two years of age shall produce 250.5 lbs. of butter-fat in a year, and the requirements are increased one-tenth of a pound per day for every day over that age. That means that a cow exactly three years old would have to make 287.0 lbs. of fat, a four-year-old must make 323.5 lbs. of fat, and cows five years old and over are required to make 360.0 lbs. of fat in a year.

The credential of a Register of Merit test is a certificate for every cow that qualifies. This certificate always raises the value of a cow, because her

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productive ability is positively known, not guessed at. Accurate figures offer a positive working basis for breeding operations, and it is for this reason that Register of Merit cows and their offspring are always in demand, and at a good price. It has been said that "the Register of Merit" mark is to a cow what "Sterling" is to silver.

The details, such as methods and costs of Register of Merit work are as follows: In the first place a breeder should think of getting the proper testing equipment, and he will need a testing outfit consisting of scales, some glassware and a bottle of acid. A complete outfit, including testing machine, can be bought for about \$9.00 at any dairy supply house. The next thing to do is to write to the A. J. C. C. for application blank and a set of rules for carrying on the work. The State College should be communicated with at the same time, as arrangements must be made to get a supervisor to the farm for two days each month. When you begin to test you keep your milk record on a barn sheet, the milk of every milking being weighed and set down, and at the end of each month you copy these entries on a regular form, which must be sent to the A. J. C. C. office. Always get these records in promptly. In the case of a cow making more than fifty pounds of fat a month her name is posted in the "Fifty Pound List", printed once each month in the Jersey Bulletin. The "Fifty Pound List" has great advertising value for your herd, as it is closely read by all who are interested in Jerseys.

HIGHEST YIELDS OF JERSEYS

Best Five Records in Year's Tests at Various Ages. Jan. 31, 1919

Class 1. — Cows Under Two Years

<i>Name and H. R. Number of Cows</i>	<i>Milk Lbs.</i>	<i>Per Cent of fat</i>	<i>Butter-fat Lbs.</i>
Lucky Farce 298177	14,260.0	4.46	635.7
Lass 64th of Hood Farm 266735...	9,830.3	6.17	606.6
St. Mawes Beauty 295047.....	10,239.0	5.73	586.9
St. Mawes Susy Olga 341308.....	9,976.1	5.73	571.2
King's Golden Diploma 252638...	9749.4	5.73	559.0

Class 2. — Cows Two and Under Two and One-half Year

Pearly Exile of St. Lambert 205101	12,345.5	6.61	816.1
Sophie's Bertha 313238.....	13,242.8	5.82	771.1
Sophie's Emily 352291.....	13,792.1	5.25	723.56
Lass 66th of Hood Farm 271896...	14,513.1	4.96	720.5
Old Man's Darling 2d 319617.....	10,431.1	6.66	694.4

Class 3. — Cows Two and One-half and Under Three Years

Irene's Cherry 285828.....	12,562.7	5.97	749.9
Lad's Lady Riotress Irene 279715..	12,307.8	5.37	660.8
Lass 73d of Hood Farm 277540....	10,953.4	6.02	659.4
Ioa Queen 333655.....	11,239.3	5.76	647.37
Nutwood Figgis 328160.....	10,406.2	6.07	631.74

Class 4. — Cows Three and Under Three and One-half Years

Vive La France 319616.....	12,744.8	7.00	892.63
Sophie's Bertha 313238.....	14,954.2	5.55	829.5
Sophie's Charity 314359.....	11,850.2	6.34	751.69
Goldie's Nehalem Beauty 283330...	12,267.7	6.07	750.5
St. Mawes Beauty 295047.....	12,515.6	5.98	747.9

Class 5. — Cows Three and One-half and Under Four Years

Lass 66th of Hood Farm 271896...	17,793.7	5.11	910.6
Lady's Silken Glow 313311.....	13,305.0	6.63	882.5
Eminent's Foxy Belle 304982.....	14,920.6	5.47	816.65
Lass 83d of Hood Farm 289023....	14,524.2	5.31	760.9
Figgis 97th of Hood Farm 273502..	14,796.9	5.07	750.6

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Class 6. — Cows Four and Under Four and One-half Years

Sophie's Adora 299594.....	15,852.2	5.60	888.0
Jap's Sayda's Baroness 321895.....	14,438.3	6.00	866.78
Successful Queen 278743.....	16,389.3	5.20	852.7
Lass 64th of Hood Farm 266735....	13,344.6	6.08	817.7
Interested Jap's Santa 292928.....	13,308.5	6.05	805.72

Class 7. — Cows Four and One-half and Under Five Years

Olympia's Fern 252060.....	16,147.8	5.81	937.8
Goldie's Nehalem Beauty 283330..	15,323.5	5.91	904.91
Sophie's Bertha 313238.....	16,102.1	5.44	875.41
Sophia 19th of Hood Farm 189748..	14,373.2	5.95	854.9
Rosaire's Olga 4th's Pride 179509 .	14,104.9	5.93	837.0

Class 8. — Cows Five Years and Over

Sophie's Agnes 296759.....	16,212.0	6.17	1000.07
Sophie 19th of Hood Farm 189748..	17,557.8	5.69	999.1
Spermfield Owl's Eva 193934.....	16,457.4	6.04	993.3
Eminent's Bess 209719.....	18,783.0	5.13	962.8
Dosoris Park Lily 233783.....	16,728.1	5.72	957.4

MEDAL AWARDS FOR PRODUCTION

TO APPLY TO ALL COWS WHOSE TESTS ARE STARTED
ON OR AFTER JANUARY 1, 1920

Adopted November 21, 1919

The following awards in Classes I., II., III. and IV. will be made to all cows for production in authenticated tests (conducted under the rules of the Club) that are finished in each calendar year and fully reported to the Club on or before the fifteenth day of May in the year immediately following; provided that each of said cows shall have carried a living calf at least one hundred and fifty-five days during the period covered by her test.

Class I — Open Championships

- AWARDS: 1. A. J. C. C. Gold Medal.
2. The Medal of Merit
3. The President's Cup-Grand Championship — National Grand Championship

1. Every registered Jersey cow producing 700 lbs. and less than 850 lbs. of butter-fat in a period not exceeding one year, regardless of age or location, will be awarded the A. J. C. C. Gold Medal.

2. Every registered Jersey cow producing 850 lbs. or more of butter-fat as above will be awarded the Medal of Merit.

3. The cow in Class I. producing the most butter-fat as above shall be known as the Grand Champion Cow of the year in which her test is completed, and, if her butter-fat production is 1000 lbs. or more, will in addition to the Medal of Merit be awarded the President's Cup and shall be known thereafter as a National Grand Champion, which title shall pertain to all cows which produce 100 lbs. or more of butter-fat as above.

Class II — State Championships

AWARDS: A. J. C. C. SILVER MEDALS

The registered Jersey cow producing the most butter-fat in a period not exceeding one year in each State of the United States will be awarded the A. J. C. C. Silver Medal, and shall be known as the Champion of the State wherein her test was begun for the year in which completed.

*Class III — Class Championships***AWARDS: A. J. C. C. SILVER MEDALS**

The registered Jersey cow in any of the following classes producing the most butter-fat in a period not exceeding one year, regardless of location, will be awarded the A. J. C. C. Silver Medal, and shall be known as National Champion of her respective class for the year in which the test is completed.

Sub-Class A — Junior two year old (under $2\frac{1}{2}$ yrs. at beginning test)

“ “ B — Senior two year old ($2\frac{1}{2}$ and under 3 years at beginning test)

“ “ C — Junior three year old (3 yrs. and under $3\frac{1}{2}$ at beginning test)

“ “ D — Senior three year old ($3\frac{1}{2}$ and under 4 yrs at beginning test)

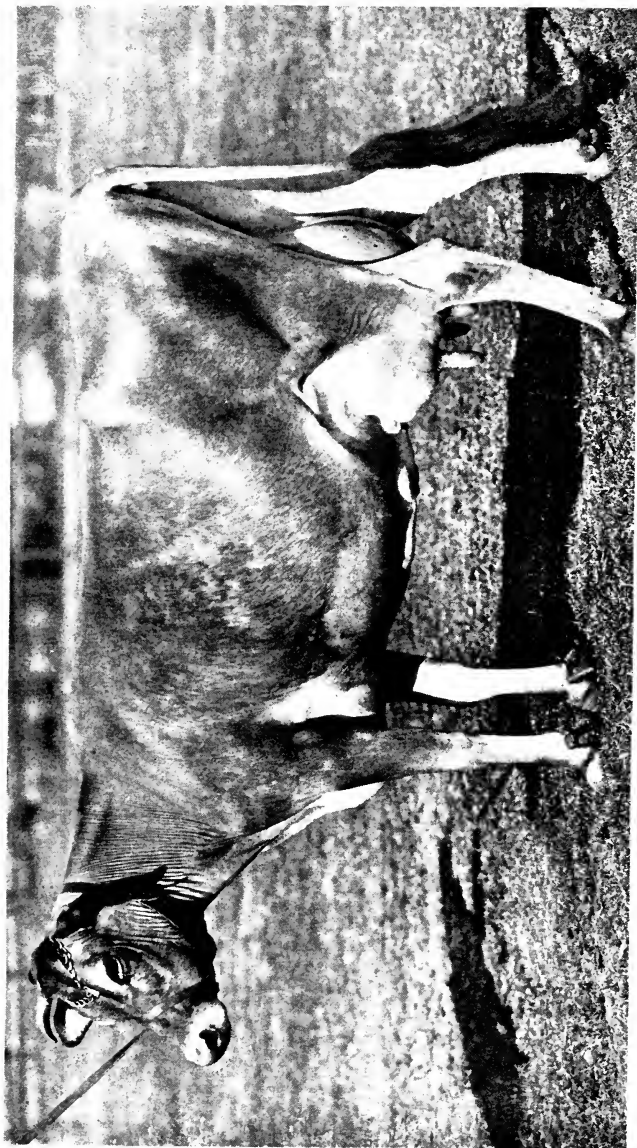
“ “ E — Junior four year old (4 yrs. and under $4\frac{1}{2}$ at beginning test)

“ “ F — Senior four year old ($4\frac{1}{2}$ and under 5 yrs. at beginning test)

“ “ G — Aged cow (5 yrs. and over at beginning test)

*Class IV — State Class Championships***AWARDS: A. J. C. C. BRONZE MEDALS**

The registered Jersey cow in any of the following classes producing the most butter-fat in a period not exceeding one year in each State of the United States will be awarded the A. J. C. C. Bronze Medal, and shall be known as the State Class Champion of the



APRIL LUSTRE

(Granddaughter of Noble of Oaklands)

(Winner of Parish Prize, Island of Jersey, 1912-13-14-17)

respective class and State wherein the test was begun for the year in which completed.

Sub-Class A — Junior two year old (under $2\frac{1}{2}$ yrs. at beginning test)

“ “ B — Senior two year old ($2\frac{1}{2}$ and under 3 years at beginning test)

“ “ C — Junior three year old (3 yrs. and under $3\frac{1}{2}$ at beginning test)

“ “ D — Senior three year old ($3\frac{1}{2}$ and under 4 yrs. at beginning test)

“ “ E — Junior four year old (4 yrs. and under $4\frac{1}{2}$ at beginning test)

“ “ F — Senior four year old ($4\frac{1}{2}$ and under 5 yrs. at beginning test)

“ “ G — Aged cow (5 yrs. and over at beginning test)

*Class V — Bulls With Three or More Daughters
With Yields of 700 Pounds or Over of Fat*

AWARDS: A. J. C. C. GOLD MEDALS

Every registered Jersey bull which has three or more daughters (out of different dams) which have produced 700 lbs. or over of fat in a period not exceeding one year, and which have carried a living calf at least one hundred and fifty-five days during the periods covered by their tests, will be awarded the A. J. C. C. Gold Medal.

*Class VI — Bulls With Three or More Daughters
With Yields of Fat in Accordance With Age*

AWARDS: A. J. C. C. SILVER MEDALS

Every registered Jersey bull which has three or

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more daughters (out of different dams) which heretofore have produced or may hereafter produce butter-fat in a period not exceeding one year in authenticated tests equalling or exceeding the following amounts, and which have carried a living calf at least one hundred and fifty-five days during the periods covered by their test, shall be awarded the A. J. C. C. Silver Medal; viz:

If a test is commenced the day a cow is two years and ninety-five days old, or previous thereto, she must produce 500 lbs. of butter-fat, and for each day the cow is older than two years and ninety-five days two-tenths (0.2) of a pound of butter-fat must be added to the initial requirement of 500 lbs. Thus at an age at beginning test of five years the required amount of butter-fat will have become 700 lbs., which amount must be produced by all cows beginning test at this age.

Medals will be sent to the last recorded owners of bulls.

RETESTING

Compulsory Retest — (a) If the production of milk during the two days of official supervision averages thirty pounds or more per day, with an average percentage of butter-fat of seven per cent or more; or if the milk averages fifteen pounds or more per day, with an average percentage of butter-fat of eight per cent or more; the test supervisor shall at once inform the agricultural college he represents, and the college shall have a retest made for two days, by another test supervisor, within ten

days after the termination of the first test. The Club will pay the entire cost of retests made under this rule.

Owner's Privilege of Retesting — (b) If the milk averages in any two days supervision period below four per cent butter-fat, or 0.75 per cent or more below that found by the previous month's test, the owner may have a retest made within ten days, at his own expense, upon immediate notice to the test supervisor or to the college.

College's Privilege to Make Extra Tests — (c) An agricultural college may make extra tests of cows under its supervision when it considers such tests advisable, but without expense to the owner of the cows.

Club's Right to Make Extra Tests — (d) The Club may order additional tests at any time, and will pay the entire cost of such tests.

All Test Data to be Reported — (e) All data secured in cases of retesting or extra testing shall be reported immediately to the Club, and all or any of such may be used in determining the average percentage of fat, the Club reserving the right of disregarding abnormal results in the case of any test.

Use of Data Obtained in Retests — (f) If the average percentage of fat in a retest does not vary more than two per cent from the average shown by the regular test, the average of the fat percentages shown by both tests may be applied to the milk of the month in which they were made.

Should both the regular test and the retest show abnormal results, both tests may be disregarded, and

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the average percentage of fat in the milk of the month may be determined by averaging the percentages of fat of the preceding and succeeding months.

Should the variation between the regular test and the retest be greater than two per cent, the Club may determine which, if either, of the tests shall be used.

In determining the average percentage of fat, the results of an accepted retest shall be averaged with the regular test in connection with which it was made.

APPENDIX

The following provisions of Article III are taken from the Agricultural Law relating to Dairy Products in the State of New York and are in general similar to the laws of other states.

ARTICLE 3

DAIRY PRODUCTS

Section

30. Definitions.
31. Care and feed of cows, and care and keeping of the produce from such cows.
32. Prohibiting the sale of adulterated milk, imitation cream and regulating the sale of certified milk.
33. Regulations in regard to manufactories, plants or places where milk or cream is brought or received and the value thereof is determined by the milk fat content.
34. Penalty for delivery of adulterated milk.
35. Inspection; how conducted.
- 35a. Fat tests of composite samples of milk.
36. Branded cans, jars or bottles not to be sold, re-marked or used without consent of owner.
- 36a. Registration of milk cans, jars, or bottles.
37. Regulations in regard to evaporated or condensed milk.

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38. Manufacture and sale of imitation butter prohibited.
39. Manufacture or mixing of animal fats with milk, cream or butter prohibited.
40. Prohibited articles not to be furnished for use.
41. Coloring matter, dairy terms, size of package, labeling, penalties.
42. Coloring matter in food products; analysis by state board of health.
43. Manufacture and sale of imitation cheese prohibited.
44. When prohibitions do not apply to skim-milk or skim-cheese.
45. Unclean receptacles and places for keeping milk; notice to violators of provisions.
46. Unsanitary cans and receptacles condemned.
47. Receptacles to be cleaned before returning; receptacles may be seized; evidence; violation; milk can inspectors.
48. Manufacturer's brand of cheese.
49. Use of false brand prohibited; branding of skim-milk cheese regulated.
50. County trade marks.
51. Object and intent of this article.
52. Penalties.
53. Butterine and similar products not to be purchased by certain institutions.
54. Purchase, sale and use of butterine and similar products prohibited in certain institutions.
55. Licensing of milk gathering stations where milk is bought.

56. Power of commissioner to investigate.
57. Granting and revoking licenses.
58. Certiorari to review.
59. Records to be kept.
60. Right of review.
61. Offenses.

§ 30. *Definitions.* The term "butter" when used in this article means the product of the dairy, usually known by that term, which is manufactured exclusively from pure, unadulterated milk or cream or both with or without salt or coloring matter; and the term "cheese," when used in this article, means the product of the dairy usually known by that term, which is manufactured exclusively from pure, unadulterated milk or cream, or both, and with or without coloring matter, salt, rennet, sage, olives, pimentos, walnuts, peanuts, tomatoes, celery salt or onions added thereto as a flavor. And provided further, that when manufactured by adding to the elemental product of the dairy, usually known by the term "cheese," and manufactured exclusively from pure unadulterated milk or cream, or both, any pimentos, olives, walnuts, peanuts, celery salt, tomatoes, or onions, that the percentage of all such substances so added shall not exceed twenty-five per centum in bulk of the manufactured product.

The terms "oleomargarine," "butterine," "imitation of butter," or "imitation cheese" shall be construed to mean any article or substance in the semblance of butter or cheese not the usual product of the dairy and not made exclusively of pure or unadulterated milk or cream, or any such article or

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substance into which any oil, lard or fat not produced from milk or cream enters as a component part, or into which melted butter or butter in any condition or state, or any oil thereof has been introduced to take the place of cream. The term "adulterated milk" when so used means:

1. Milk containing more than eighty-eight and one-half per centum of water or fluids.

2. Milk containing less than eleven and one-half per centum of milk solids.

3. Milk containing less than three per centum of fats.

4. Milk drawn from cows within fifteen days before and five days after parturition.

5. Milk drawn from animals fed on distillery waste or any substance in a state of fermentation or putrefaction or on any unhealthy food.

6. Milk drawn from cows kept in a crowded or unhealthy condition; or milk produced or kept in unsanitary surroundings or in any environment or under any condition whatever that is inimical to its healthfulness or wholesomeness.

7. Milk from which any part of the cream has been removed.

8. Milk which has been diluted with water or any other fluid, or to which has been added or into which has been introduced any foreign substance whatever.

All adulterated milk shall be deemed unclean, unhealthy, impure and unwholesome. The term "milk" when used, shall mean the whole, fresh, clean, lacteal secretion obtained by the complete milking of one or more healthy cows, properly fed and kept excluding

that obtained within fifteen days before the five days after calving, or such longer period as may be necessary to render the milk practically colostrum-free, and the term "pure cream" or "unadulterated cream" when used singly or together, mean cream taken from pure and unadulterated milk. The term "adulterated cream" when used shall mean cream containing less than eighteen per centum of milk fat or cream to which any substance whatsoever has been added. (*As amended by chapter 455 of the Laws of 1913 and chapter 84 of the Laws of 1918.*)

§ 31. *Care and feed of cows, and care and keeping of the produce from such cows.* No person shall keep cows, for the production of milk for market or for sale or exchange, or for manufacturing the milk or cream from the same into any article of food, in a crowded or unhealthy condition or in unhealthful or unsanitary surroundings and no person shall keep such cows or the product therefrom in such condition or surroundings or in such places as shall cause or tend to cause the produce from such cows to be in an unclean, unhealthful or diseased condition, if the produce from such cows is to be sold, offered or exposed for sale upon the markets for consumption or to be manufactured into any food product, nor shall such cows or the produce therefrom be handled or cared for by any person suffering with or affected by an infectious or contagious disease, nor shall any such cows be fed on any substance that is in a state of putrefaction or fermentation, or upon any food that is unhealthful or that produces or may produce impure, unhealthful, diseased or unwholesome milk.

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But this section shall not be construed to prohibit the feeding of ensilage. The commissioner of agriculture is hereby empowered to give such instruction and impart such information as in his judgment may be deemed best to produce a full observance of the provisions of this section. (*As amended by chapter 216 of the Laws of 1910.*)

§ 32. *Prohibiting the sale of adulterated milk, imitation cream and regulating the sale of certified milk.* No person shall sell or exchange or offer or expose for sale or exchange, any unclean, impure, unhealthy, adulterated or unwholesome milk or any cream from the same, or any unclean, impure, unhealthy, adulterated, colored, or unwholesome cream, or sell or exchange, or offer or expose for sale or exchange, any substance in imitation or semblance of cream, which is not cream, nor shall he sell or exchange, or offer or expose for sale or exchange any such substance as and for cream, or sell or exchange, or offer or expose for sale or exchange any article of food made from such milk or cream or manufacture from any such milk or cream any article of food. No person shall sell or exchange, or offer or expose for sale or exchange, as and for certified milk, any milk which does not conform to the regulations prescribed by and bear the certification of a milk commission appointed by a county medical society organized under and chartered by the medical society of the state of New York and which has not been pronounced by such authority to be free from antiseptics, added preservatives, and pathogenic bacteria, or bacteria in excessive numbers. All milk sold

as certified milk shall be conspicuously marked with the name of the commission certifying it. Any person delivering milk to any butter or cheese factory, condensary, milk gathering station or railway station to be shipped to any city, town or village shall be deemed to expose or offer the same for sale whether the said milk is delivered or consigned to himself or another. Each and every can thus delivered, shipped or consigned, if it be not pure milk, must bear a label or card upon which shall be stated the constituents or ingredients of the contents of the can.

§ 33. *Regulations in regard to manufactories, plants or places where milk or cream is brought or received and the value thereof is determined by the milk fat content.* No person shall sell, supply or bring to any butter or cheese factory or to any plant or place which manufactures a food product from milk or which ships or sells milk for consumption any milk diluted with water, or any unclean, impure, unhealthy, adulterated or unwholesome milk, or milk from which any of the cream has been taken, except pure skim milk to skim-cheese factories. No person shall sell, supply or bring to be manufactured to any butter or cheese factory or to any plant or place which manufactures a food product from milk or which ships or sells milk for consumption any milk from which has been kept back any part of the milk commonly known as strippings, or any milk that is sour, except pure skim milk to skim-cheese factories. The owner or proprietor or the person having charge of any such manufactory, plant

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or place where milk is received for any such purpose, not buying all the milk used by him, shall not use for his own benefit, or allow any of his employes or any other person to use for his own benefit, any milk, cream, butter or cheese or any other product thereof, brought to such factory, without the consent of the owners of such milk or the products thereof. Every such manufactory, plant or place not buying all the milk used, shall keep a correct account of all the milk or cream daily received, of the number of packages of butter and cheese made each day, and the number of packages and aggregate weight of cheese and butter disposed of each day; which account shall be open to inspection to any person who delivers milk to such manufactory, plant or place. Whenever such manufacturers or owners of such manufactories, plants or places receive or purchase milk or cream upon the basis of the amount of milk fat contained therein and use for ascertaining the amount of such fat what is known as the Babcock test, or whenever the proceeds of co-operative creameries or such manufactories, plants or places are allotted on the basis of determinations of milk fat by the Babcock test, the bottles and pipettes used in such test shall before use be examined by the director of the New York agricultural experiment station. If such bottles are found to be properly constructed and graded so as to accurately show the amount of fat contained in milk or cream, each of them shall be legibly and indelibly¹ marked "S. B." No bottle shall be so marked except as herein pro-

So in original

vided or used in any such test by such manufacturers or owners or proprietors of such manufactories, plants or places, unless so examined and marked. The acid used in making such test shall be examined from time to time by competent chemists employed by the department of farms and markets and if found not to be of sufficient strength the use of such acid shall be prohibited. No person or persons receiving or purchasing milk or cream upon the basis of the amount of fat contained therein shall credit any patron or patrons delivering milk or cream thereto with a greater or lesser percentage or average percentage of fat than is actually contained in the milk or cream so delivered. The department of farms and markets or persons employed by it for that purpose may at any time assist in making tests of milk or cream received at such manufactories, plants or places for the purpose of determining the efficiency of tests usually made at such manufactories, plants or places. All persons using other than standard bottles or acid which is not of the required strength to accurately determine the amount of fats in milk or cream or crediting any patron or patrons delivering milk or cream with a greater or lesser percentage or average percentage of fat than is actually contained in the milk or cream so delivered, shall be subject to the penalties prescribed by section fifty-two of this article, and shall be guilty of a misdemeanor. (*As amended by chapter 83, Laws of 1918.*)

§ 34. *Penalty for delivery of adulterated milk.* Any person, firm, association or corporation deliver-

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ing any milk to any butter or cheese factory in violation of any of the provisions of this chapter shall forfeit and pay to the patrons, firm, association or corporation owning the milk delivered to such factory the sum of fifty dollars, to be recovered in a civil action by the person, firm, association or corporation entitled thereto.

§ 35. *Inspection; how conducted.* When the commissioner of agriculture, an assistant commissioner, or any person or officer authorized by the commissioner, or by this chapter, to examine or inspect any product manufactured or offered for sale shall in discharge of his duties take samples of such product, he shall before taking a sample, request the person delivering the milk or who has charge of it at the time of inspection, to thoroughly stir or mix the said milk before the sample is taken. If the person so in charge refuses to stir or mix the milk as requested, then the person so requesting shall himself so stir and mix the milk before taking the sample, and the defendant shall thereafter be precluded from introducing evidence to show that the milk so taken was not a fair sample of the milk delivered, sold, offered or exposed for sale by him. The person taking the sample of milk for analysis shall take duplicate samples thereof in the presence of at least one witness, and he shall in the presence of such witness seal both of such samples, and shall tender, and, if accepted, deliver at the time of taking one sample to the manufacturer or vender of such product, or to the person having custody of the same, with a statement in writing of the cause of the

taking of the sample. In taking samples of milk for analysis at a creamery, factory, platform or other place where the same is delivered by the producer for manufacture, sale or shipment, or from a milk vender who produces the milk which he sells, with a view of prosecuting the producer of such milk for delivering, selling or offering for sale adulterated milk, the said commissioner of agriculture or assistant or his agent or agents shall within ten days thereafter, with the consent of the said producer, take a sample in a like manner of the mixed milk of the herd of cows from which the milk first sampled was drawn and shall deliver the duplicate sample to the said producer and shall cause the sample taken by himself or his agent to be analyzed. If the sample of milk last taken by the commissioner of agriculture or his agent or agents shall upon analysis prove to contain no higher percentage of milk solids, or no higher percentage of fat than the sample taken at the creamery, factory, platform or other place, then no action shall lie against the said producer for violation of subdivisions one, two, three, seven and eight of section thirty of this chapter. In taking a second sample as above set forth from the mixed milk of the herd, it shall be the duty of the commissioner of agriculture to have an assistant, agent or agents present during the entire time in which the said cattle are being milked to observe closely so as to be sure that the milk thus to be sampled is not adulterated and to see that it is thoroughly mixed so that the sample taken shall be a fair sample of the average quality of the mixed milk

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of the entire dairy or herd of cows of said producer. If, however, the said producer refuses to allow such examination of the milk produced by his dairy, then he shall be precluded from offering any evidence whatever tending to show that the milk delivered by him at the said creamery, factory, platform or other place was just as it came from the cow. If the said producer does permit such examination, the commissioner of agriculture shall, upon receiving application therefor, send to said producer a copy of the analysis of each of the samples of milk so taken and analyzed as above provided. If a sample of milk shall have been taken by the commissioner of agriculture or by his orders or directions from any dairy within this state and an analysis thereof has been made by the commissioner or by his authority, any person who is or was buying milk from the said dairy at or subsequent to the time of such taking, may apply to the commissioner of agriculture for a copy of the analysis of the said sample of milk so taken and the commissioner shall thereafter furnish the said applicant with such copy. (*As amended by chapter 608 of the Laws of 1911.*)

§ 35-a. *Fat tests of composite samples of milk.* Corporations, associations or persons hereafter buying milk from producers of milk to be paid for on the basis of the percentage of milk fat contained therein and for that purpose taking samples therefrom to form a composite sample to be tested periodically to determine its value on such basis, shall, at the request of the producer, take such samples in duplicate and subject them to the same treatment.

At the end of the period for which the composite sample is being taken such corporation, association or person shall tender same to the producer thereof or to his authorized agent and give such producer, or his said authorized agent, the choice of one of the two composite samples so taken. Such producer is hereby permitted to send such duplicate composite sample so received to the head of the department of dairy industry of the college of agriculture at Cornell University within ten days from the receipt thereof, properly marked for identification, and shall accompany same with his name and post office address. Such department head shall cause such sample to be tested for the per centum of milk fat and shall send a report of such test to the producer from whom it was received within ten days, or as soon thereafter as possible. Corporations, associations or persons hereafter testing samples of milk under the provisions of this section shall reseal the remaining portion of the composite sample from which the test was made, to determine the value of the milk bought from producers, and keep the same for at least ten days after the making of such test for the purpose of permitting the commissioner of agriculture or his duly authorized representative to examine and test the same.

Any person testing milk or cream by the Babcock method where the result of such test is used as a basis for payment, or for official inspection, or for public record, shall first obtain from the commissioner of agriculture a license to do such testing. Such license shall be granted upon satisfactory evi-

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dence of good moral character and the ability to make such tests based upon satisfactorily passing an examination set by the commissioner of agriculture. Such examination shall be based upon methods for making the Babcock test as outlined by the New York state college of agriculture and the commissioner of agriculture. Licenses granted under this section shall be revocable by the commissioner of agriculture upon evidence of dishonesty, incompetency or inaccuracy. Licenses shall be granted for one year renewable at the discretion of the commissioner of agriculture without further examination. (*As amended by Chapter 546, Laws of 1917 and Chapter 125, Laws of 1918.*)

§ 36. *Branded cans, jars or bottles not to be sold, re-marked or used without consent of owner.* No person shall hereafter without the consent of the owner or shipper, use, sell, dispose of, buy or traffic in any milk can, jar or bottle, or cream can, jar or bottle, belonging to any dealer or shipper of milk or cream residing in the state of New York or elsewhere, who may ship milk or cream to any city, town or place within this state, having the name or initials of the owner, dealer or shipper, stamped, marked or fastened on such can, jar or bottle, or wilfully mar, erase or change by re-marking or otherwise said name or initials of any such owner, dealer or shipper, so stamped, marked or fastened upon said can, jar or bottle. Nor shall any person without the consent of the owner place in any such can, jar or bottle, any substance or product other than milk or cream.

§ 36-a. *Any person owning milk cans, jars or*

bottles upon which he has placed or desires to place any designating mark may register the said designating mark with the commissioner of agriculture, who shall keep a record thereof, and he may also register with the commissioner of agriculture, from time to time, the number of such cans, jars or bottles which he has or is to have, which do or may bear such designating mark. Such cans, jars or bottles may, after such registration be numbered consecutively and such consecutive numbers may be registered in the department of agriculture, as above provided, with the designating mark. If any such can, jar or bottle, bearing such designating mark, shall be found in the possession of, and being used by any person other than the one so registering the same it shall be presumptive evidence of a violation of the provisions of the agricultural law, unless such person has the consent of the owner thereof to so have and use the same.

No person, except the original owner thereof, or a person duly authorized by him so to do, shall remove, deface or erase any of the marks upon the cans, jars or bottles herein provided for.

When the commissioner of agriculture, or any person duly authorized by him, shall find any such cans, jars or bottles, bearing such registered designating mark, in the possession of or being used by another person than the owner thereof, he may seize the same, and if evidence is not produced in three days showing that such person had been given permission to have or use such cans, jars or bottles, then they shall be delivered by the commissioner of agricul-

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ture, or his agents, to the person from whom taken, otherwise the commissioner of agriculture shall notify the owner of such cans, jars or bottles that he has the same and upon application deliver the same to such owner. (*As amended by chapter 242 of the Laws of 1917.*)

§ 37. *Regulations in regard to evaporated or condensed milk.* No evaporated or condensed milk shall be made or offered or exposed for sale or exchange unless manufactured from pure, clean, healthy, fresh, unadulterated and wholesome milk from which the cream has not been removed either wholly or in part, except for the purpose of standardizing, in which case such standardized evaporated or condensed milk shall contain the proportionate quantity of solids and the proportionate amount of fats required in evaporated or condensed milk. Evaporated or condensed milk manufactured, sold or exposed for sale or exchange in hermetically sealed cans shall contain milk solids in quantity not less than twenty-five and five-tenths per centum, and not less than seven and eight-tenths per centum milk fat. Sweetened condensed milk manufactured, sold or exposed for sale or exchange in hermetically sealed cans shall contain not less than twenty-eight per centum milk solids and not less than eight per centum milk fat. No person shall manufacture, sell or offer for sale or exchange in hermetically sealed cans, any condensed milk unless put up in packages upon which shall be distinctly labeled or stamped the name of the person or corporation by whom made and the brand by which or under which it is made. When evaporated

or condensed milk shall be sold from cans or packages not hermetically sealed, the producer shall brand or label the original cans or packages with the name of the manufacturer of the milk contained therein, provided, however, that no unsweetened evaporated or condensed milk sold or offered for sale in containers not hermetically sealed, unless the proportion of milk solids shall be the equivalent of eleven and one-half per centum of milk solids in crude milk, and of which milk solids twenty-five per centum shall be fats. (*As amended by chapter 323 of the Laws of 1917.*)

§ 33. *Manufacture and sale of imitation butter prohibited.* No person by himself, his agents or employees, shall produce or manufacture out of or from any animal fats or animal or vegetable oils not produced from unadulterated milk or cream from the same, the article known as oleomargarine or any article or product in imitation or semblance of natural butter produced from pure, unadulterated milk or cream of the same; or mix, compound with or add to milk, cream or butter any acids or other deleterious substance or any animal fats or animal or vegetable oils not produced from milk or cream, so as to produce any article or substance or any human food in imitation or in semblance of natural butter, nor sell, keep for sale or offer for sale any article, substance or compound, made, manufactured or produced in violation of the provisions of this section, whether such article, substance or compound shall be made or produced in this state or elsewhere. Any person manufacturing, selling, offering or exposing

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for sale any commodity or substance in imitation or semblance of butter, the product of the dairy, shall be deemed guilty of a violation of this chapter, whether he sells such commodity or substance as butter, oleomargarine or under any other name or designation whatsoever and irrespective of any representations he may make relative to such commodity or substance. Any dealer in any article or product, the manufacture or sale of which is prohibited by this section, who shall keep, store or display such article or product, with other merchandise or stock in his place of business, shall be deemed to have the same in his possession for sale.

§ 39. *Manufacture or mixing of animal fats with milk, cream or butter prohibited.* No person shall manufacture, mix or compound with or add to natural milk, cream or butter any animal fats or animal or vegetable oils, nor make or manufacture any oleaginous substance not produced from milk or cream, with intent to sell the same as butter or cheese made from unadulterated milk or cream or have the same in his possession with such intent; nor shall any person solicit or take orders for the same or offer the same for sale, nor shall any such article or substance or compound so made or produced, be sold as and for butter or cheese, the product of the dairy. No person shall coat, powder or color with annatto or any coloring matter whatever, butterine or oleomargarine or any compound of the same or any product or manufacture made in whole or in part from animal fats or animal or vegetable oils not produced from unadulterated milk or

cream by means of which such product, manufacture or compound shall resemble butter or cheese, the product of the dairy; nor shall he have the same in his possession with intent to sell the same nor shall he sell or offer to sell the same. No person by himself, his agents or employees, shall manufacture, sell, offer or expose for sale, butter that is produced by taking original packing stock or other butter or both and melting the same, so that the butter fat can be drawn off, then mixing the said butter fat with skimmed milk or milk or cream or other milk product and rechurning the said mixture, or that is produced by any similar process and is commonly known as boiled or process butter, unless he shall plainly brand or mark the package or tub or wrapper in which the same is put up in a conspicuous place with the words "renovated butter" or "process butter." If the same shall be put up, sold, offered or exposed for sale in prints or rolls, then the said prints or rolls shall be labeled plainly with printed letters in a conspicuous place on the wrapper with the words "renovated butter" or "process butter." If the same is packed in tubs or boxes or pails or other kind of a case or package the words "renovated butter" or "process butter" shall be printed on the top and side of the same in letters, at least, one inch in length, so as to be plainly seen by the purchaser. If such butter is exposed for sale, uncovered, not in a package or case, a placard containing the label so printed shall be attached to the mass of butter in such manner as to easily be seen and read by the purchaser. Every person selling, offering or ex-

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posing for sale at retail, "renovated butter" or "process butter," shall cause each parcel or package of such butter delivered to or for a customer to be wrapped in a light colored paper on which shall be printed in black letters, not less than three-eighths inch square and in Gothic type, the words "renovated butter" or "process butter." No person shall sell, offer or expose for sale, any butter or other dairy products containing a preservative, but this shall not be construed to prohibit the use of salt in butter or cheese, or spirituous liquors in club or other fancy cheese or sugar in condensed milk. No person, firm, association or corporation shall induce or attempt to induce any person to violate any of the provisions of this chapter. Any person, firm, association or corporation selling, offering or advertising for sale any substance, preparation or matter for use in violation of the provisions of this chapter shall be guilty of a violation of this section.

§ 40. *Prohibited articles not to be furnished for use.* No keeper or proprietor of any bakery, hotel, boarding-house, restaurant, saloon, lunch-counter or place of public entertainment, nor any person having charge thereof or employed thereat, nor any person furnishing board for any others than members of his own family, or for any employees where such board is furnished for a compensation or as part of the compensation of any such employee, shall keep, use or serve therein either as food for his guests, boarders, patrons, customers or employees or for cooking purposes any article or substance made in violation of the provision of this article. Any

keeper or proprietor of any hotel, boarding-house, restaurant, saloon, lunch-counter or place of public entertainment who uses or serves therein for his guests any oleaginous substance as a substitute for butter, the manufacture or sale of which is not prohibited by the agricultural law, shall print plainly and conspicuously on the bill-of-fare, if there is one, the words, "Oleomargarine Used Here" and shall post up conspicuously in different parts of each room where such meals are served, signs in places where they can be easily seen and read, which shall bear the words, "Oleomargarine Used Here" in letters at least two inches in length and so printed as to be easily read by guests or boarders. (*As amended by chapter 357 of the Laws of 1909.*)

§ 41. *Coloring matter, dairy terms, size of package, labeling, penalties.* No person manufacturing with intent to sell any substance or article in imitation or semblance of butter or cheese not made exclusively from unadulterated milk or cream or both, with salt or rennet or both and with or without coloring matter or sage, but into which any animal, intestinal or offal fats, or any oils or fats or oleaginous substance of any kind not produced from pure, unadulterated milk or cream, or into which melted butter, or butter in any condition or state or any modification of the same, or lard or tallow shall be introduced, shall add thereto or combine therewith any annatto or compounds of the same, or any other substance or substances whatever, for the purpose or with the effect of imparting thereto a color resembling yellow, or any shade of yellow butter or

cheese, nor introduce any such coloring matter or other substance into any of the articles of which the same is composed. And no person manufacturing, selling or offering for sale any such goods shall make or sell them under any brand, device or label bearing words indicative of cows or the product of the dairy or the names of breeds of cows or cattle, nor use terms indicative of processes in the dairy in making or preparing butter; no such substance shall hereafter be sold, offered or exposed for sale in this state except it be sold in packages containing not more than five pounds, such packages to be wrapped and sealed, the original seal of which shall be unbroken and upon which seal shall be plainly printed the name and address of the manufacturer of said oleomargarine, and the said packages shall be plainly and conspicuously labeled with the word "Oleomargarine" in Gothic or equally conspicuous letters at least three-eighths of an inch high. The word "Oleomargarine" in large prominent letters shall be stamped by indentation on each separate brick or portion of the substance itself before it is wrapped and sealed.

Any person violating any of the provisions of sections forty or forty-one of the agricultural law shall forfeit and pay a penalty to the people of the state of New York of not less than fifty dollars nor more than one hundred dollars for the first violation and not less than two hundred dollars nor more than five hundred dollars for the second and each subsequent violation. Whoever by himself or another violates any of the provisions of sections forty or

forty-one of the agricultural law shall be guilty of a misdemeanor and upon conviction shall be punished by a fine of not less than one hundred dollars nor more than five hundred dollars or by imprisonment of not less than one month nor more than one year or by both such fine and imprisonment for the first offense and by not less than six months nor more than one year for the second offense. (*As amended by chapter 638 of the Laws of 1917.*)

§ 42. *Coloring matter in food products; analysis by state board of health.* No person or persons shall manufacture, sell or expose for sale any poisonous coloring matter for the coloring of food products of any kind, nor shall any person or persons use any poisonous coloring matter manufactured, sold, offered or exposed for sale within this state; nor shall any person or persons sell, offer or expose for sale any food product containing such poisonous coloring matter. The state commissioner of health shall cause samples of coloring matter that are exposed for sale upon the market for use in food products to be analyzed and report the results of such analysis to the legislature at the next session.

§ 43. *Manufacture and sale of imitation cheese prohibited.* No person shall manufacture, deal in, sell, offer or expose for sale or exchange any article or substance, in the semblance of or in imitation of cheese made exclusively of unadulterated milk or cream, or both, into which any animal, intestinal or offal fats or oils, or melted butter or butter in any condition or state or modification of the same, or oleaginous substances of any kind not

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produced from unadulterated milk or cream, shall be introduced.

§ 44. *When prohibitions do not apply to skim-milk or skim-cheese.* The prohibitions contained in this article against the sale of adulterated milk shall not apply to skim-milk, which is clean, pure, healthy, wholesome and unadulterated, except by skimming, if it is sold for and as skimmed milk. The prohibitions in this article against the sale of cheese made from adulterated milk or cream, shall not apply to pure skim-cheese made from milk which is clean, pure, healthy, wholesome and unadulterated, except by skimming. (*As amended by chapter 540 of the Laws of 1917.*)

§ 45. *Unclean receptacles and places for keeping¹ milk; notice to violators of provisions.* No person, firm, association or corporation, producing, buying or receiving milk for the purpose of selling the same for consumption as such, or for manufacturing the same into butter, cheese, condensed milk, or other human food, shall keep the same in utensils, cans, vessels, rooms, or buildings that are unclean or have unsanitary surroundings or drainage or in any condition whatsoever that would tend to produce or promote conditions favorable to unhealthfulness or disease. The commissioner of agriculture shall notify all persons, firms, associations or corporations, violating this section, to clean said utensils, cans, vessels, rooms, or buildings, or to so improve the sanitary conditions that the law will not be violated, and if such notice is complied with in ten days' time, Sun-

¹ So in original

days excepted, then no action shall lie for a violation of this section. Any person having charge of any milk gathering station where milk is received from the dairymen for the purpose of selling the same for consumption or shipping the same to market for consumption as human food before taking such charge or operating or working as such agent or person in charge shall apply to the commissioner of agriculture for a license to so work or operate or have charge, and shall at the time of making such application, file with the commissioner a statement under oath, setting forth the fact that he will not while having charge of or operating any such milk gathering establishment or while employed therein adulterate or suffer or permit the adulteration of any such milk or any product thereof during the term for which he may be licensed. After the applicant shall have complied with the foregoing provisions of this section, the commissioner of agriculture upon being satisfied that the applicant is a person of good moral character and a qualified and proper person to so have charge of or operate any such milk gathering station or establishment shall issue to said applicant a license, which shall qualify him to have charge of any such milk gathering station or establishment for the period of two years from the date of such license; provided, however, that where milk is to be bought from the dairymen at any such milk gathering station by the proprietor, person in charge or any agent of the proprietor of such station, such license shall be only for a period of one year, as provided in sections fifty-five to sixty-four, inclusive, of

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this article, and the matter required to be set forth in the application for a license under the provisions of this section shall be set forth in the application provided for in sections fifty-five to sixty-four in addition to the matters therein required. The person regularly doing the work of receiving, caring for and shipping the milk at any station or establishment, or in case more than one person is so employed then the foreman in charge of such works shall be deemed to be a person in charge of such station or establishment within the meaning and purposes of this section. Such license certificate shall be kept at such station or establishment where the license is so employed and shall be open to the inspection of the representatives of the department of agriculture and the public. Any person having charge of any milk gathering station or establishment as aforesaid shall keep a true and correct monthly record of the receipts of milk or other dairy products received at such station or establishment, and also a true and correct monthly record of all sales or shipments of milk, cream or other dairy products shipped or sold from such station or establishment, and shall also keep a true and correct monthly record of the amount of skim milk produced in such station or establishment and of the disposition of said skim milk. Such record shall be preserved at such station or establishment for at least two years after the same shall have been made and such records shall at all times be open to the inspection of the commissioner of agriculture, his assistants or agents. When cream is sold or shipped from any such station or

establishment so selling or shipping milk for consumption as aforesaid, each original bottle or package of one quart or less of cream so shipped or sold shall bear a label securely attached to the side of such bottle or package on which shall be conspicuously printed the word "cream" in black letters of at least one-fourth of an inch in length or else the word "cream" shall be blown in the side of such bottle in plain raised letters of at least one-half an inch in length, and the top and side of each and every other original package or can containing cream or original crate or case containing bottles of cream so shipped or sold shall bear a label securely attached on which shall be conspicuously printed the word "cream" in black letters of at least one inch in length and also a plainly written or printed statement on the label stating from whom and what station the same is shipped and the name of the consignee and point of destination and the date on which the cream therein was produced by such separation or skimming. The shipment of each and every such original package of cream so shipped and not so labeled as herein required shall constitute a separate violation. When cream is so separated or skimmed from milk at any such station or establishment and the supply of milk on hand thereat at the time of the next regular daily shipment of milk therefrom, consisting of the total amount of milk in such shipment, together with that remaining on hand immediately after such shipment, is not thereby decreased or correspondingly less than the total quantity received during any period extending from some point of time be-

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fore such skimming was done until the time of such shipment, together with the amount of milk on hand at the commencement of such period, and such decrease is not equal in amount to the quantity of milk that must have been used in so separating such cream in addition to the quantity otherwise there used or disposed of during such period, such fact is conclusive that skim milk or other foreign substance was added to such milk supply within such period and shall be presumptive evidence within the meaning of this section that the same was added to each can or vessel of milk in such shipment. When cream or skim milk is found to have been on the premises of any such station or establishment or is sold or shipped therefrom, such cream or skim milk so found or so sold or shipped therefrom shall be presumed to have been produced by separating or skimming at such station or establishment. In any action or proceeding relative to the adulteration of milk by removing cream therefrom or adding skim milk or other foreign substance thereto, it shall be presumed that when cream has been produced by so skimming or separating or butter has been manufactured, there was made at least five quarts of milk in the production of each quart of cream so produced and there was necessarily so produced thereby at least four quarts of skim milk to each quart of cream so produced, and that there was used at least nine quarts of milk in the production of each pound of butter so manufactured. If any such person so duly licensed shall thereafter refuse or neglect to keep and preserve full and complete records as herein required or

shall refuse to exhibit such records to the commissioner of agriculture, his assistants or agents or shall violate any of the provisions of this section or any of the provisions of this chapter relative to milk or the products thereof he shall forfeit his license and shall be disqualified for a period of five years from being again licensed by the commissioner of agriculture. (*As amended by chapter 408 of the Laws of 1913.*)

§ 46. *Unsanitary cans and receptacles condemned.* All cans, or receptacles used in the sale of milk, cream or curd for consumption, or in transporting or shipping the same to market or the delivery thereof to purchasers for consumption as human food, when found by the commissioner of agriculture or his assistants or agents to be in unfit condition to be so used by reason of being worn out, badly rusted, or with rusted inside surface, or unclean or unsanitary or in such condition that they can not be rendered clean and sanitary by washing, and will tend to produce or promote in milk, cream or curd when contained therein, bad flavors, unclean or unwholesome conditions favorable to unhealthfulness or disease, shall be condemned by the commissioner of agriculture or his assistants or agents. Every such can or receptacle when so condemned shall be marked by a stamp, impression or device, designed by the commissioner of agriculture, showing that it has been so condemned, and when so condemned shall not thereafter be used by any person for the purpose of so selling, transporting or shipping milk, cream or curd.

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§ 47. *Receptacles to be cleansed before returning; receptacles may be seized; evidence; violation; milk can inspectors.* Whenever any can or receptacle is used for transporting or conveying milk, cream or curd to market for the purpose of selling or furnishing the same for consumption as human food, which can or receptacle, when emptied, is returned or intended to be returned to the person so selling, furnishing or shipping such substance to be again thus used, or which is liable to continued use in so transporting, conveying, selling or shipping such substance as aforesaid, the consumer, dealer or consignee using, selling or receiving the milk, cream or curd from such can or receptacle, shall, before so returning such can or receptacle remove all substances foreign to milk therefrom, by rinsing with water or otherwise. When any such milk, cream or curd is sold within any city of this state or shipped into any such city, the fact of such shipment or sale shall be prima facie evidence that the same was so shipped or sold for consumption as human food. When any such can or receptacle is returned or delivered or shipped to any person or creamery so selling such substance within, or shipping the same into such city, it is deemed that such can or receptacle is liable to such continued use in so selling or shipping such substance therein for consumption as human food within the meaning and purposes of this section and section forty-six. No person shall place or suffer to be placed in any such can or receptacle any sweepings, refuse, dirt, litter, garbage, filth or any other animal or vegetable substance, nor shall any such

consignee or other person through himself, his agent or employee, bring or deliver to any person or railroad or other conveyance any such can or receptacle for the purpose of such return, or any milk, cream or curd can or receptacle for the purpose of delivery or shipment to any person or creamery engaged in so selling or shipping such substances for consumption as human food, which can or receptacle contains such foreign substance or which has not been rinsed as herein provided. The word "curd" as used in this section and section forty-six applies to the substance otherwise known as "pot cheese" or "cottage cheese." Whenever any such can or receptacle is used, returned, delivered or shipped in violation of this section, or of section forty-six of this chapter, every such use, return, delivery or shipment of each such can or receptacle shall be deemed a separate violation thereof. Such cans or receptacles so used, returned, delivered or shipped in violation of this section or of section forty-six may be seized by the commissioner of agriculture, his assistants or agents and held as evidence of such violation. For the proper enforcement of this section and section forty-six, the commissioner of agriculture may appoint two milk can inspectors to be stationed chiefly in the city of New York who shall receive the usual compensation of other agents of the department of agriculture. (*As amended by chapter 608 of the Laws of 1911.*)

§ 48. *Manufacturer's brand of cheese.* Every manufacturer of whole-milk cheese may put a brand or label upon such cheese indicating "whole-milk cheese" and the date of the month and year when

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made; and no person shall use such a brand or label upon any cheese made from milk from which any of the cream has been taken. The commissioner of agriculture shall procure and issue to the cheese manufacturers of the state, on proper application therefor, and under such regulations as to the custody and use thereof as he may prescribe, a uniform stencil brand or labels bearing a suitable device or motto, and the words, "New York state whole-milk cheese." Every such brand or label shall be used upon the outside of the cheese and shall bear a different number for each separate factory. The commissioner shall keep a book, in which shall be registered the name, location and number of each manufactory using the brands or labels, and the name or names of the persons at each manufactory authorized to use the same. No such brand or labels shall be used upon any other than whole-milk cheese or packages containing the same. (*As amended by chapter 207 of the Laws of 1910.*)

§ 49. *Use of false brand prohibited; branding of skim-milk cheese regulated.* No person shall offer, sell or expose for sale, in any package, butter or cheese which is falsely branded or labeled. No person shall sell, offer or expose for sale cheese commonly known as cheddar cheese or stirred curd cheese made from skimmed or partially skimmed milk unless the same is branded to show that it is skim-milk cheese. All such cheese so sold, offered or exposed for sale shall be branded with the words "skim-milk cheese," or if such cheese contains thirteen per centum of milk fat or over, it may be

branded "medium skim-milk cheese," or if it contains eighteen per centum of milk fat or over, it may be branded "special skim-milk cheese." Cheese known as cheddar cheese, cheddar style cheese, stirred curd cheese, twin cheese, flats, daisies, daisy twins, longhorns and young americas containing more than forty per centum of moisture shall when sold, offered or exposed for sale be branded or marked conspicuously with the words "cheddar cheese excess moisture."

Cheese known as "washed curd cheese" shall not be manufactured, sold, offered or exposed for sale upon the markets of this state unless it is branded or marked conspicuously with the words "washed curd cheese." Any such cheese containing more than forty-two per centum of moisture shall be branded or marked conspicuously with the words "washed curd cheese excess moisture." The branding herein provided shall be upon the sides of both the cheese and the container and shall be in block letters at least one-half an inch square. (*As amended by chapter 197, Laws of 1917, and chapter 126, Laws of 1918.*)

§ 50. *County trade marks.* At a regular or special meeting of a county dairymen's association in any county of the state there may be adopted a county trade mark, by a majority of the members present and voting, to be used as a trade mark by a person manufacturing pure unadulterated butter or full-cream cheese in such county. The secretary of the association shall forthwith send to the commissioner of agriculture a copy of such trade mark, which copy

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he shall place on file in his office, noting thereupon the day and hour he received the same. But one county trade mark for butter and for cheese shall be placed on file for the same county. No association shall adopt any trade mark of any county already on file, or use that of any other county in the formation of a trade mark.

§ 51. *Object and intent of this article.* This article and each section thereof are declared to be enacted to prevent deception in the sale of dairy products, and to preserve the public health, which is endangered by the manufacture, sale and use of the articles or substances herein regulated or prohibited.

§ 52. *Penalties.* Every person violating any of the provisions of this chapter, shall forfeit to the people of the state of New York the sum of not less than fifty dollars nor more than one hundred dollars for the first violation and not less than one hundred dollars nor more than two hundred dollars for the second and each subsequent violation. When such violation consists of the manufacture or production of any prohibited article, each day during which or any part of which such manufacture or production is carried on or continued, shall be deemed a separate violation. When the violation consists of the sale, or the offering or exposing for sale or exchange of any prohibited article or substance, the sale of each one of several packages shall constitute a separate violation, and each day on which any such article or substance is offered or exposed for sale or exchange shall constitute a separate violation. If the sale be of milk and it be in cans, bottles or con-

tainers of any kind and if the milk in any one of such containers be adulterated, it shall be deemed a violation whether such vendor be selling all the milk in all of his containers to one person or not. When the use of any such article or substance is prohibited, each day during which or any part of which said article or substance is so used or furnished for use, shall constitute a separate violation, and the furnishing of the same for use to each person to whom the same may be furnished shall constitute a separate violation. Whoever by himself or another violates any of the provisions of articles chapter or of sections one hundred six, one hundred three, four, six, eight and nine or sections three hundred fourteen and three hundred fifteen of this seven and one hundred eight of this chapter shall be guilty of a misdemeanor, and upon conviction shall be punished by a fine of not less than fifty dollars, nor more than two hundred dollars, or by imprisonment of not less than one month nor more than six months or by both such fine and imprisonment, for the first offense; and by six months' imprisonment for the second offense. (*As amended by chapter 384 of the Laws of 1916.*)

§ 53. *Butterine and similar products not to be purchased by certain institutions.* No money appropriated by law for maintenance and support in whole or in part of a state institution; nor money received by a charitable, benevolent, penal or reformatory institution from the state, or from a county, city or town thereof, or appropriated by such county, city or town for the maintenance or support in whole or in

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part of such institution; nor money belonging to or used for the maintenance or support of such institution, shall be expended for the purchase of, or in payment for, butterine, oleomargarine, lard, cheese, or articles or products in imitation or semblance of natural butter or cheese produced from pure unadulterated milk or cream from the same, which articles or products have been rendered or manufactured in whole or in part from animal fats, or animal or vegetable oils not produced from unadulterated milk or cream from the same.

§ 54. *Purchase, sale and use of butterine and similar products prohibited in certain institutions.* No officer, manager, superintendent or agent of an institution mentioned in section fifty-three of this chapter, shall purchase for the use of such institution articles or products, for the purchase of which the money appropriated by law, or by a county, city or town, is forbidden to be used by section fifty-three of this chapter, and no person shall sell to, or for the use of such institution, such articles or products. Nor shall such articles or products be used as articles of food or for cooking purposes in such institutions within this state.

§ 55. *Licensing of milk gathering stations where milk is bought.* On and after September first, nineteen hundred and thirteen, no person, firm, association or corporation, shall buy milk or cream within the state from producers for the purpose of shipping the same to any city for consumption or for manufacture unless such business be regularly transacted at an office or station within the state and unless

such person, firm, association or corporation be duly licensed as provided in this and the ensuing sections of this article. Every such person, firm, association or corporation before engaging or continuing in the business of buying milk or cream for the purposes aforesaid, shall, annually, on or before August first, file an application with the commissioner of agriculture for a license to transact such business. The application shall state the nature of the business, as hereinabove set forth, the full name of the person or corporation applying for the license, and, if the applicant be a firm or association, the full name of each member of such firm, or association, the city, town or village and street number at which the business is to be conducted, and such other facts as the commissioner of agriculture shall prescribe. The applicant shall further satisfy the commissioner of his or its character, financial responsibility and good faith in seeking to carry on such business. The commissioner shall thereupon issue to such applicant, on payment of ten dollars, a license entitling the applicant to conduct the business of buying milk and cream from producers for the purpose aforesaid at an office or station at the place named in the application until the first day of September next following; provided, however, that if the application be presented in the month of July, and if the applicant so elects, such license may be granted to begin on the first day of September next following and run for a term of one year. A license shall not be issued, however, to any applicant if during the year preceding the filing of the application a complaint

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from any producer and seller of milk or cream shall have been filed with the commissioner against such applicant for any of the grounds specified in section fifty-seven hereof, and such complaint shall have been established as true and just to the satisfaction of the commissioner after such complaint shall have been investigated by the commissioner in the manner provided by section fifty-six hereof. A license shall not be issued as provided in this section, on and after the taking effect of this section, unless the applicant for such license shall file with the application a good and sufficient surety bond, executed by a surety company, duly authorized to transact business in this state, in a sum not less than five thousand dollars, or shall be relieved from such requirement as provided herein. Such bond shall be approved as to its form and sufficiency by the commissioner of agriculture.

Such applicant may in lieu of such bond deposit with the commissioner of agriculture money or securities in which the trustees of a savings bank may invest the moneys deposited therein, as provided in the banking law, in an amount equal to the sum secured by the bond required to be filed as herein provided.

The bond required to be filed hereunder shall be given to the commissioner of agriculture in his official capacity and shall be conditioned for the faithful compliance by the licensee with the provisions of this chapter, as hereby amended, and for the payment of all amounts due to persons who have sold milk or cream to such licensee, during the period that the

license is in force. The money or securities deposited with the commissioner of agriculture, as above provided, shall constitute a separate fund and shall be held in trust for, and applied exclusively to, the payment of claims against the licensee making such deposit, arising from the sale of milk or cream to such licensee.

Upon default by the licensee in the payment of any money due for the purchase of milk or cream, which payment is secured by a bond or the deposit of money or securities as hereinbefore provided for, the creditor may file with the commissioner of agriculture, upon a form prescribed by him, a verified statement of his claim. If such creditor shall have reduced such claim to judgment or shall thereafter and before the commencement of the action by the commissioner of agriculture, as hereinafter provided for, reduce such claim to judgment, a transcript of such judgment shall also be filed with such commissioner.

Such statements may be filed at any time during the period of the license for purchases made during such period and within ninety days from the termination of such period.

After the expiration of ninety days from the termination of any license period the commissioner of agriculture shall, by proper action wherein all such creditors and any surety upon any bond given as hereinbefore provided for and the licensee shall be parties, proceed to determine the amount due each creditor, and the judgment rendered in such action shall be enforced ratably for such creditors against

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the surety on the bond, if one there be, or against the moneys or securities deposited as hereinbefore provided for. If any such creditor shall have reduced his claim to judgment such judgment shall be presumptive proof of the amount due such creditor in any action brought by the commissioner of agriculture as hereinbefore provided for.

Every bond given pursuant to the provisions hereof shall be applicable, in the first instance, to the payment of all claims arising during the license period for which such bond shall continue, and filed either during such period or within ninety days after the expiration thereof. If all such claims shall be paid the balance available upon such bond shall be devoted to the extinguishment ratably of claims arising during such license period, but for which statements shall not have been filed until after ninety days after the expiration of such period.

All moneys and securities, deposited as herein provided for, shall be applicable, in the first instance, to the extinguishment of claims, properly filed, arising during the license period for which such moneys or securities were originally deposited and if, after the extinguishment of such claims, there shall be a surplus remaining such surplus shall be devoted to extinguishment of claims arising during any preceding license period which were properly filed as hereinbefore provided, all claims for any one license period to be of a parity. Any surplus remaining after the extinguishment of such prior claims shall be added to the moneys or securities then on deposit with the

commissioner of agriculture or, if there be at that time on file with such commissioner a bond given pursuant to this section, or if there be then on deposit with such commissioner additional moneys or securities deposited as herein provided for, and if such bond or such moneys or securities, as the case may be, shall, in the opinion of the commissioner of agriculture, be sufficient, such surplus shall be returned to the licensee.

A person or corporation licensed hereunder shall make a verified statement of his or its disbursements during a period to be prescribed by the commissioner of agriculture, containing the names of the persons from whom such products were purchased, and the amount due to the vendors thereof. Such statement shall be submitted to the commissioner of agriculture when requested by him and shall be in the form prescribed by such commissioner. If it appears from such statement or other facts ascertained by the commissioner of agriculture, upon inspection or investigation of the books and papers of such licensee as authorized by section fifty-six of this chapter, that the security afforded to persons selling milk and cream to such licensee by the bond executed or deposit made by such licensee as herein provided does not adequately protect such vendors, the commissioner of agriculture may require such licensee to give an additional bond or to deposit additional money or securities, to be executed or deposited as above provided, in a sum to be determined by the commissioner, but not exceeding by more than twenty-five per centum the maximum amount paid

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month: Provided, however, that the maximum amount of the bond or deposit required from any applicant under the provisions of this section shall be one hundred thousand dollars; and that any applicant filing a bond or depositing money or securities in such maximum amount shall be exempted from filing either the statements of milk purchased, or the statements of disbursements in this section provided for.

If the applicant for a license under this section be a person or a domestic corporation, the commissioner of agriculture may, notwithstanding the provisions of this section, if satisfied from an investigation of the financial condition of such person or domestic corporation that such person or corporation is solvent and possessed of sufficient assets to reasonably assure compensation to probable creditors, by an order filed in the department of agriculture, relieve such person or corporation from the provisions of this section requiring the filing of a bond.

The term "station" or "milk gathering station," as used in this and the ensuing sections of this article, shall include an established office where the business of buying milk or cream as herein provided is carried on, with or without a place or premises in connection therewith for the physical handling of milk or cream. (*As amended by chapter 651 of the Laws of 1915.*)

§ 56. *Power of commissioner to investigate.* The commissioner and his assistants shall have power to investigate upon the complaint of any interested person, or of his own motion, the record of any per-

son, firm or corporation applying for or holding a license, or any transaction involving the purchase by such applicant or licensee or attempted purchase of milk for shipment as provided in section fifty-five; and for such purpose may examine the ledgers, books of account, memoranda or other documents of any such person, firm, association or corporation applying for or holding a license and may take testimony therein under oath; but information relating to the general business of any such person, firm, association or corporation, disclosed by such investigation and not relating to the immediate purpose thereof shall be deemed of a confidential nature by the commissioner, his assistants, representatives and employees. When a complaint is filed with the commissioner, he shall attempt to secure an explanation or adjustment, and, failing this within ten days, he shall cause a copy of the complaint, together with a notice of the time and place for a hearing thereon, to be served personally or by mail upon said applicant or licensee. If served by mail, such complaint and notice shall be directed to the applicant or licensee at his place of business, with postage fully prepaid thereon. Such service shall be made at least seven days before the hearing. At the time and place appointed for such hearing, the commissioner or his assistants shall hear the parties to the complaint, shall have power to administer oaths and shall enter in the records of the office of the commissioner of agriculture a decision either dismissing such complaint or specifying the facts which he deems established on such hearing. (*As added by chapter 408 of the Laws of 1913.*)

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§ 57. *Granting and revoking licenses.* The commissioner of agriculture may decline to grant a license or may revoke a license already granted when he is satisfied of the existence of the following cases or either of them:

1. Where a money judgment has been secured by any milk producer and has been entered against such applicant or licensee and remains unsatisfied of record.

2. Where there has been a failure to make prompt settlements to persons from whom he buys milk, with intent to defraud.

3. Where there have been combinations to fix prices.

4. Where there has been a continual course of dealing of such nature as to satisfy the commissioner of the inability of the applicant or licensee to properly conduct the business or of an intent to deceive or defraud customers.

5. Where there has been a continued and persistent failure to keep records required by the commissioner or by law. (*As added by chapter 408 of the Laws of 1913.*)

§ 58. *Certiorari to review.* The action of the commissioner of agriculture in refusing to grant a license, or in revoking a license granted under section fifty-five, shall be subject to review by writ of certiorari, and if such proceedings are begun to review the revocation of license, the license shall be deemed to be in full force and effect until the final determination of certiorari proceedings and all appeals therefrom. (*As amended by chapter 651 of the Laws of 1915.*)

§ 59. *Records to be kept.* Every proprietor of a milk gathering station shall keep, in such form as the commissioner of agriculture may prescribe, a record of transactions of purchases of milk or cream by him and he shall, at least semi-monthly, deliver to each person from whom he receives or purchases milk or cream, and in the unit of measure used in computing the amount due therefor, an itemized statement of the several amounts or quantities of such milk or cream so received or purchased at such milk station from such person during the prior half month or, if statements are delivered more frequently than semi-monthly during that period of time which has elapsed since the delivery of such last prior statement. If the milk or cream is purchased or received on a butter fat basis, such statement shall include the percentage, or average percentage of butter fat contained in said milk or cream as determined by tests periodical or otherwise. Every such proprietor of a milk gathering station shall post in a conspicuous place in such milk station, a schedule of the prices being paid for milk or cream including the premiums paid or deductions made, if any, for milk or cream containing milk fat either in excess or in lesser amount than the agreed standard, and shall keep a correct account of all the milk or cream daily received or purchased from each person at such milk station which account shall be open to inspection by said person. (*As amended by chapter 651 of the Laws of 1915.*)

§ 60. *Right to review.* If either party to the transaction of purchase and sale between a milk

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producer or a milk seller and a licensed buyer of milk shall be dissatisfied relative to any transaction of purchase and sale of milk between a milk seller and a licensed buyer of milk, he may apply to the commissioner of agriculture, in writing, within sixty days after the delivery of such milk to the licensed buyer, for investigation. The commissioner of agriculture shall treat such application as a complaint, and shall cause a full investigation of the transaction complained of to be made either by himself or one of his assistants, in the manner provided by section fifty-seven. (*As added by chapter 408 of the Laws of 1913.*)

§ 61. *Offenses.* Any person who, being a buyer of milk for shipment for the purposes set forth in section fifty-five, whether such person be licensed or whether his business be transacted at a station or otherwise, shall (a) fail to make prompt payments for milk purchased, with intent to defraud, or (b) shall make any false or misleading statement or statements enumerated in sections fifty-five to fifty-nine inclusive, with intent to deceive or (c) enter into any combination to fix prices, or (d) not being licensed, shall conduct the business of buying milk for shipment as provided in section fifty-five, or (e) being licensed or otherwise, engages in such business without having a station or office therefor, or (f) fails to conform to any requirement of or violates any provision of sections fifty-five to fifty-nine, inclusive, with intent to deceive a seller of milk, shall be guilty of a misdemeanor. (*As added by chapter 408 of the Laws of 1913.*)

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